# THE PHILOSOPHY OF DEATH.

THE

# PHILOSOPHY OF DEATH;

OR

A GENERAL MEDICAL AND STATISTICAL

# TREATISE

ON THE

## NATURE AND CAUSES OF HUMAN MORTALITY.

BY

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"*Nascentes morimur, finisque ab origine pendet.*"
Being born we die, and our end depends upon our origin.

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# PREFACE.

The object of the author, in submitting the following pages to the Public, is to give the general reader a condensed view of the principal causes of death in the human species. The scientific, and the professional, reader may be apt to find fault with the brief statements made both in the medical and statistical departments; but it must be admitted that a full treatise on the subject would form a work by far too tiresome and extensive for the generality of readers.

As the work has no pretensions to originality, the author offers his most respectful acknowledgments to the different writers from whose labours he has chiefly compiled the volume; and as the most of the works referred to are either of a scientific, or professional, nature, the present small treatise will perhaps be the medium of diffusing a portion of their interesting contents amongst a class of readers, who have neither time nor opportunity of consulting detached, and more elaborate, inquiries on the subject.

Markinch, 25th March 1841.

## ERRATA.

Page 14, line 35, for *synonia* read *synovia.*
—— 236, —— 4, for *Esquiral* read *Esquirol.*
—— 243, —— 20, for *withheld* read *upheld.*

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## CHAPTER I.

On the different Forms of Matter, and the General Laws by which they are governed and changed—On the Development and Formation of the Human Body in connexion with the Vital Functions—And on Life and Organization.

As the various changes which take place in animal matter, both in health and disease, and after death, can only be illustrated by reference to the natural laws and certain scientific principles, we will commence the present inquiry with a brief enumeration of these, in connexion with those particular branches of science most intimately related to the subject.

The science of Chemistry makes us acquainted with the elementary particles of which the various productions of nature are radically composed. According to the principles of that science, all bodies are either *simple* or *compound*. A simple body may be termed a natural production, which invariably presents the same relative characteristics; thus an atom of sulphur cannot be reduced by any known means into any two atoms possessing different properties; therefore sulphur is termed a simple body. But such is not the case with some substances equally simple looking. Lime has just as much the appearance of a simple body as

sulphur; but an atom, or rather the smallest particle, of lime can be reduced into two atoms which possess very different properties; the one atom will be a metal called *calcium*, the other a gas called *oxygen;* each of these possess very different properties, and are of themselves simple bodies: so lime is a compound body, because it is made up of two simple ones. Now, all bodies, whether animate or inanimate, are composed or made up of simple bodies. The simple bodies are about 46 in number; but a full description of them belongs exclusively to the science of Chemistry.

All simple bodies, as sulphur, calcium, charcoal, &c., present an uniform appearance, from all their component particles or atoms being quite the same, and from their being aggregated always in the same manner. Now, the aggregation of the minute atoms of simple bodies into masses seems to be regulated by a fixed principle or law, which has been termed *the attraction of cohesion*, being that attractive power or force which holds or binds the minute atoms of simple bodies together. This principle, then, may be considered the formative agent over simple atoms—preserving them always in one uniform state of existence; it may therefore be termed *their preservative principle.*

*Compound bodies* are very numerous, and are composed of two or more simple bodies. Animal and vegetable fibre, lime, coal, basalt, &c. &c. are compound bodies. In short, all the various productions of nature, with the exception of a few of the simple bodies, which are sometimes found uncombined with any thing else, are compound bodies or substances. But compound bodies are both of natural and artificial formation: basalt and coal are natural compound bodies, but glass and many other substances are artificial compound bodies. Now, the simple or ultimate atoms of all compound bodies, however minute, are governed in all their combinations by their inherent principle, *the attraction of cohesion;* but, in forming compound bodies,

they are also influenced or governed by another principle, namely, *elective affinity*. This principle, then, is considered the formative agent of compound bodies, and holds them in that state of existence; it may, therefore, be termed *their preservative principle.*

Now, the component parts of animals and vegetables are, in the first place, simple bodies, obeying the laws of *the attraction of cohesion;* in the second place, they are compound bodies, obeying the laws of *elective affinity*. But they are also *living* bodies, and are endowed with a principle termed *vitality*. This principle, then, is the preservative agent of *living* bodies, and holds them in that state of existence; it is, therefore, termed *their vital or preservative principle.*

All bodies, then, whether *simple*, *compound*, or *living*, are governed by one or more principles of preservation; so, when any of these principles are destroyed or overcome by any other natural agent, a series of changes is induced, which gradually reduces them to an elementary state of existence. The *attraction of cohesion*, which governs the ultimate atoms of all bodies, whether simple or compound, is the universal fundamental power of nature; for it is the sustaining principle of all masses of matter, without which neither *gravitation*, *elective affinity*, nor *vitality* could exist. As it is by the power of electricity that compound bodies can be most completely decomposed into their elementary particles or atoms, that principle is considered the agent or sustaining power of *elective affinity*. The electrical state of bodies seems to determine all their particular combinations, both in respect to animate and inanimate matter. Mr Cross, in his striking experiments, has shewn that compound minerals can be formed by the agency of electricity; and by that agency he has also called forth the manifestations of life in the development, as is supposed, of the dormant *nidi* or germs of insects incorporated in flint. Such being the case, electricity is considered the principle of *elective affinity*.

As *elective affinity* holds the component particles of compound bodies together, it is the sustainer of all the various natural productions in their different and specific combinations, both as animate and inanimate bodies, but the former, as we said above, are governed also by *vitality*, and, consequently, represent peculiar manifestations altogether. Again, all bodies, whether animate or inanimate, are governed by gravitation, which is that power or principle which holds different compound masses in proper relation to each other.

The ultimate particles of all natural productions, then, are called elementary atoms. These atoms combined give rise to simple and compound masses, which are the different geological formations. These again produce soils for the growth of vegetables; and vegetables are the sustenance of man and animals. All these productions are governed by certain laws, consistent with their use in the economy of nature; and the continued operations of those laws bring about all the changes which are requisite for their reproduction and endurance.

*Geology* teaches us that changes are not confined to animated nature alone. That science shows that an universal process of reproduction and decay is constantly going on in what may be termed the functional parts of our earth. On its surface we observe the marks of former great convulsions from the violent shocks of earthquakes, and from the effects of other natural phenomena; and we also observe the marks of more recent changes from the constant influence of water in the wearing down of soils and rocks, their integral particles being swept into the sea—the great laboratory of new formations.

But the minute study of Geology discloses a very wide field for research into those various elementary changes, which have been constantly in operation upon the earth, both as affecting the materials of which the mineral world is composed, and also the remains of those vegetables and animals which are found embedded in, and changed into,

mineral substances, as exemplified in the different petrefactions or fossils. But a regular series of changes, for the fulfilment of useful purposes in nature, is constantly going on in the mineral world. Rocks absorb *oxygen* from the atmosphere, by which process their surface is gradually broken up; the hardest minerals being thus converted into soils for the growth of vegetables and the maintenance of animals; thus raising the mineral world a step higher in the scale of creation. And upon examining geological specimens we find that vegetables and animals of a former period have been enveloped by the elementary particles of the mineral kingdom, and that their remains, by a peculiar process of appropriation, have become quite assimilated to the rock which contains them.

Such geological curiosities afford an excellent example of the wonderful changes which may take place, after death, upon the corporeal remains of animated beings; they show that the remains of one kingdom of nature are appropriated to the support and reproduction of another. A succession of elementary changes in the mineral world thus gives rise to important results as affecting both the vegetable and animal creation. Indeed, these changes are the direct support of the animated creation; for, without the reciprocal action of powerful agents in decomposing and in again renewing the face of the earth, all its productive operations would soon cease—soils would become barren of every useful growth, and would gradually merge into a state quite unfit to support the meanest vegetation. Indeed, life itself would ultimately become unknown!

The whole progress of nature seems to have been a steady advance from the simple to the more complex productions, just as her various created elementary works became more and more perfect, by the successive evolutions of those primary properties with which they were first endowed by the Creator. Of this we have sufficient evidence in the geological remains of former ages. In the primary formations of our earth we find no specimens of

the remains of either vegetables or animals. The hard primitive rocks, *granite, gneiss, primitive limestone*, &c., in their compact form of existence, gave rise to no processes of growth for the support either of vegetable or of animal life. But as the surface of the earth became farther evolved in the formation of another series of rocks, which have been termed *transition*, the first and most simple of living structures, *corals, encrinites*, and *testacia*, were called into being. These primary living structures were but a step removed from the mineral creation, being composed of almost equal proportions of animal matter and lime. Then with the *floetz rocks*, and coal formations, there were vegetable productions, as ferns, reeds, flags, and different kinds of succulent stalks and plants. Above these again are found the remains of many different marine animals, as *vertebral* fishes, marine *oviparous* quadrupeds and *echinites* ; and, lastly, in the more recent or *alluvial* formations, there are found the remains of numerous land quadrupeds, as of the elephant, mammoth, elk, hyenas, &c. Such has been the progress of nature, from simple to compound bodies ; from inanimate to animate ; from the most simple animated creatures to the more complex, and gradually up to the present world of complicated mineral, vegetable, and animal productions.

The sciences of Anatomy, Physiology, and Pathology, treat of the structure, of the physical or organic functions, and of the diseased conditions, of the animal body respectively; but Chemistry also has contributed very much to the elucidation of these different principles of the animal economy, both in health and in disease.

*Chemistry* has taught us that the ultimate or elementary atoms of our bodies are composed of the GASES—*azote, oxygen, hydrogen, &c.*, which are combined in various ways with the SOLIDS—*carbon, lime, soda, magnesia, sulphur, phosphorus*, and some others ; and that science has also taught us that after death the corporeal parts of our bodies are again resolved into these elementary substances.

*Anatomy* has taught us that the body is composed of SOLIDS and FLUIDS. The solids and fluids are generally called *skin, muscle, tendon, cellular substance, bone, brain, nerve, blood, lymph, &c. &c.* Anatomy has also revealed to us the forms and modifications of these principles, and their mechanical adaptation to the performance both of the animal and vital functions.

*Physiology* and *Pathology*, or doctrines of life and of disease, have made us acquainted, to a great extent, with the vital functions, and with the various changes which take place in the animal economy both in health and disease. Physiology has revealed to us the nature of the vital actions of the system, which give rise to the formation of all those products which prove the essential stimuli of the vital parts; and Pathology embraces the investigation of all those diseased or unhealthy products, which result from certain derangements of the system, and which constitute disease itself.

In taking a retrospective view of what we have briefly enumerated regarding the different forms of matter, and those apparent laws or principles by which they are governed, it will be observed that they are all influenced by one or more of those principles, according to their relative degrees of organization or composite structure. Simple atoms are only governed by one principle, namely, the *attraction of cohesion.* Compound atoms again are governed by two principles—the *attraction of cohesion* and *elective affinity.* And living bodies are governed by three principles—the *attraction of cohesion, elective affinity,* and *vitality.* So all the changes which they respectively undergo are more or less complicated, according to their rank in organization and according to the laws by which they are governed.

Before giving a general outline of the structure and functions of the animal body as associated with life or vitality, it may be proper, in order to assist the general reader, to explain a few of the terms generally used in

connection with Anatomical and Physiological investigations.

The term *life*, used in its general sense, is applied to all living bodies, whether vegetable or animal. Living bodies, again, being composed of different structures or organs, the term *organ* is applied to all those different parts which are of a particular construction, and which perform some particular function. Thus, the heart, lungs, kidneys, liver, stomach, &c., are all termed *organs*, and their operations for different purposes in the economy are termed *functions*. So we speak of the functions of the stomach, liver, bowels, heart, lungs, &c. The terms *organic*, *organised*, and *organisation*, are all used as very applicable to the *vital* structure and *vital* functions of the body, because they refer to those vital properties and actions in the different parts of the system, which are the result of a due construction and action of all the different organs of which it is composed. The terms *vital* and *vitality* are applied to all structures endowed with the principles of life, whether as a whole or only as a part of a living body—the vitality of a part is the source or cause of all its functional operations.

The functions of the body have been generally divided into the *organic* and *animal*. The former is that class which involve all those involuntary actions of the system, the constant continuance of which is absolutely necessary for the support of those inherent vital actions which constitute vitality; they are therefore termed the vital functions:—The action of the heart and blood vessels, the assimilation of the blood into the different textures of the body, the different secretions, the process of digestion, and the action and function of the lungs, are all *organic* or vital operations, which are carried on quite independent of any voluntary act of the individual. *The animal or natural* functions are those operations which, according to circumstances, are performed either with or without the will of the individual; such as mastication, the voluntary motions of the limbs, the acts of speaking and listening,

the voluntary directing of the eyes toward some particular object: in short, all those actions which are more or less under the control of our mental faculties, and which may be excited, either by the influence of our external senses upon the mental faculties, or by those innate passions or desires which spring from the different natural associations. Such is a brief explanation of the terms which we may frequently require to make use of. We will now offer some remarks on the development and formation of the human frame.

The evolution or development of animated productions, from reproductive causes, is one of those wonderful natural effects which has been instituted by the Creator for the continuance of all the different orders and species of the animated creation. The development of the chick in the egg affords us an opportunity of investigating the regular progress of those evolutions of organization, which ultimately lead to the formation of a living creature endowed with faculties sufficient to enable it to perform those vital and animal functions, which are to prove its stimuli or support of life.

In the eggs of fowls, immediately under the shell, there is a thin membrane, which is composed of two layers, and which envelopes or contains the *white* or albuminous portion. At the largest end of the egg this very fine membrane is separated in its layers, forming a small sac or vesicle, which has been termed the *folliculus aëris* or air bag. Opposite this little air sac, upon the surface of the yolk, there is a small gelatinous *molecule* not quite so large as the sac itself. According to Sir Everard Home, this small body communicates with the *folliculus aëris*, and is the germ or fundamental part from which the chick is formed. In about four hours after the commencement of incubation or hatching, one end of the *molecule* appears like a "white line," which is the first manifestation of the development of the embryo of the chick. In eight hours the white line is so changed that the rudiments of the brain

and spinal marrow are perceptible, the whole being surrounded by a very thin membrane called the *amnion.* In sixty hours the formation of the heart appears, which gives rise to the circulation of red blood throughout all the different embryo structures, and from this time the evolution of the chick is very rapid, for on the twenty-first day it chips the shell and escapes into the world as a living structure perfect in its kind.

Now, the human *ovum* or embryo is evolved in a way similar to that of the chick. When the human embryo is about the size of a barley corn it appears a yellowish looking body or corpuscle, apparently consisting of two portions, which are supposed to be the rudimental parts of the brain and heart. This little body is enveloped in fine membranes, which, being connected with the maternal parts, are the medium through which it receives its nourishment of growth. About the sixth week the embryo is only about the size of a split pea floating in fluid, surrounded by its membranes. Some time after this it appears like two small oval bodies, the one representing the head, the other the trunk. At the end of the second month it is about the size of a kidney bean, and by this period it has begun to assume a definite form and structure, the different parts of the face and head having gradually appeared, for by the end of the third month the eyes, nose, mouth, and lips, are all more or less perfectly formed, and the extremities have also become developed, having shot forth "like the buds of a plant." The spinal marrow exists in the earliest period, and is formed before the brain; and, as Dr Burns remarks, the human fœtus, at this stage of organisation, "resembles an animal of the lowest order. About the second month the brain is discovered, very small, and evidently formed by a prolongation of *the spinal marrow.*" About the end of the third month the fœtus measures from two and a half to three inches in length. In the fourth month it is five inches long. In the fifth about seven inches. In the sixth it measures from nine to ten inches, and

weighs "about a pound troy." "The fœtus is now so vigorous in its action, that there have been instances, though most rare, of its continuing to live if born at so premature a period." In the seventh month it is about three inches longer, and is now more able to live independent of the uterus. By the ninth month it has arrived at fœtal maturity, measures from eighteen to twenty inches, and weighs from seven to eight pounds.

So the fœtal development, or the evolution of man, from the very first manifestations of his being up to the time of his birth, is a gradual progression from the simple to the complex. At first he appears merely as a sort of gelatinous corpuscle, which is without the slightest trace of any particular organisation, merely possessing the property of imbibing nourishment by its surface, something like the *spongia animalculæ*, which belongs to the lowest grade of animal life. But as the organisation of the corpuscle proceeds a step farther, and becomes more influenced by the vital stimuli of the uterine parts, the corpuscle takes on a more complicated action; and, from becoming united by blood vessels to organs possessing the endowments of perfect animalization, it gradually becomes assimilated in its structure to the vital and animal organisation of its parents. But, during the whole period of gestation, the fœtus closely resembles the amphibious class of animals in the circulation of its blood through the heart; and it is not until it is brought forth into independent existence that all its vital organs acquire a perfect similarity of structure and action, as existing in the advanced organisation and functional operations of the body after birth.

After birth the progress of man on to maturity is slow and gradual, each period of life being accompanied with particular changes in the system. In infancy the whole frame is delicate and soft, there being a preponderance of the gelatinous and other fluids in the system. In childhood the fluids become less in proportion to the age, and in mature life there is established a due proportion of both

the fluids and the solids, so that man in his prime presents, as a whole, an assemblage of structures calculated to perform all those vital and animal functions necessary for the continuance and support of life.

The study of the structure and functions of the human body is chiefly comprised in the sciences of Anatomy and Physiology: the former treats of the structure, the latter of the functions. The human body, as composed of fluids and solids, very elaborately disposed, may be compared to a complicated machine; for it possesses so many different adaptations of structure, which all tend to some direct purpose or effect, that one and all of them give rise to those functions or actions which are the peculiar result of their mutual and conjoined associations. The animal body is so constituted, that all its different parts are calculated and adapted for specific purposes. The *bones* are the foundation, it may be said, and support of all the other parts; they are the framework upon which all the rest hangs, and they are the levers and fulcrums by which all the voluntary movements of the body are made. The *muscles* are those layers or bundles of flesh which form the general contour of the body, which adhere to the bones at certain parts either by *tendons* or by their fleshy structure, and which, having a contractile power, are the *ropes* or *cords* which give rise to all the voluntary motions of the body, and likewise to many of those motions which constitute the vital actions of the system generally. The *heart and blood vessels* constitute the *vascular* apparatus. The former is an organ of a conical shape, consisting of four distinct *muscular* cavities, whose alternate contractions propel the blood to all parts of the body through those vessels called *arteries*, and which vessels have likewise a *muscular* power of propelling their contents. The arteries, the farther they proceed from the heart, divide into branches always of smaller size, just like those of a tree; consequently they terminate at last in very minute vessels, which have been termed *capillaries* (hair-like vessels), and

which constitute the termination of the arteries and the commencement of the veins. The *veins* are those vessels by which the blood returns back again to the heart, after having been distributed to every part of the body by the *arteries*. As the blood returns from the different parts, it gets always into larger and larger branches of *veins*, until it approaches the heart itself; it is then received into its right side from the great vein *(vena cava)*, and is propelled from thence into the *pulmonary artery* (artery of the lungs), by which it is brought as near as possible to the influence of the atmospheric air, and is thus purified before being sent into the left cavity of the heart again, and from thence over all the body as before. All the above-mentioned parts have been divided by anatomists into systems, and have consequently been termed the *osseous*, *muscular*, and *vascular* systems respectively. There are also many other systems, which we will briefly enumerate.

The *respiratory system* consists chiefly of those organs termed the lungs, which are large spongy bodies filling the greater part of the cavity of the chest, and which expand and contract, in the process of respiration or breathing, by the air being alternately inhaled and exhaled through the windpipe; and which, as we have already mentioned, is the process by which the blood is purified of its *carbon* and deleterious principles after having circulated through the body.

The *digestive system* consists of those organs which have been termed the stomach, bowels, liver, spleen, &c. They are all situated in the abdomen or belly, and perform all those complicated functions of digestion which change the food in such a way as to render it capable of being taken into the system at large as nourishment. The bowels, as also the *kidneys*, act as *depuratory* organs, in eliminating the system of those matters which would prove hurtful if retained.

The *lacteal system* is a system of vessels which arise from the inner surface of the bowels, and which, by their

*open mouths*, absorb or take up the nutritient parts of the food, on its passage through the intestines, after being so changed as to admit of its being received into these vessels in a milk-like form: hence the term *lacteal* (from *lac*, milk). This fluid, taken up by the *lacteal* vessels, is called *chyle*, and being the nutritient part of the food, it is conveyed by these vessels to a large tube in which they all terminate, called the *thoracic duct.* This tube terminates in one of the large veins *(left subclavian)* in the chest, near the heart; so this chyle or lacteal fluid goes into the blood through this vein, and is thus the main source of nourishment to the body.

The *lymphatic or absorbent system* is somewhat allied to the *lacteal system.* It consists of a system of vessels which arise from the secreting surfaces of all parts and cavities of the body. These vessels have been termed *lymphatic*, from the nature of the fluid which circulates in them, and which has been termed *lymph* from its thin watery condition. These vessels, like the veins, increase in size as they recede from their origin, and they convey this thin fluid lymph (which is *secreted* by another set of vessels, namely, the *secretory vessels)* from every moistened surface or part internally situated, to the *thoracic duct;* and thus empty their contents, like the *lacteals*, into the general mass of blood.

The *secretory system* is a most important one in the animal economy. It consists in certain parts or principles of the blood being thrown out or secreted into, or upon, certain parts for specific purposes, according to the functions and uses of those parts. For example, all the internal organs are bedewed with a *serous* fluid, which lubricates their surface in such a way as to make them move easily upon each other; and all the joints in the body have *secretory* vessels which keep them constantly lubricated with an oily secretion *(synonia)*, which renders all their surface smooth and oily, and thus makes them of easy play. The eye, also, has its particular secretion,

which makes its movements so gentle and easy upon the eyelids. In short, every passage and surface of the body has a specific secretion, according to its functions. Now, it is the redundant, or rather the already used, portion of the internal secretions that the *lymphatic* vessels take up and convey back to the great repository of the body's fluids, namely, the blood.

The *glandular system* is a part of the secretory system, and is composed of certain bodies or organs of very different sizes, varying from that of a split pea—yea, even much smaller—to that of a walnut, but there are some much larger; and there are a few organs in the body, generally termed glands, which are very large, and which perform most important functions, namely, the liver, pancreas, and kidneys. These organs are perhaps somewhat different from the rest of the glandular system. The liver secretes the bile, which is a most important agent in the process of *chylification*, that is, in the food being converted into chyle in the intestines. The *pancreas* secretes a fluid also, which assists the bile in effecting changes upon the half-digested food, or *chyme*, after it passes out of the stomach into the upper portion of the bowels or *duodenum*. There are also many other glands in the system which have a specific purpose to serve. The *salivary* glands secrete the *saliva*, which assists so much in the mastication of the food, and which is also an important agent in digestion, as swallowed and carried into the stomach with our aliment. There are also small glands for specific purposes situated about the eyes, ears, nose, lips, palate, and various other parts—all of which produce different secretions, according to their destined uses. Thus, those of the ear secrete wax; those of the eyes, tears, &c.; and those of the nose a peculiar mucous. But there is a system of glands which are termed the *lymphatic glands*, from their being intimately connected with the lymphatic vessels. These glands are small round bodies, situated principally in the abdomen, and about the arm-pits and

neck. The lymphatic vessels enter these glands—indeed it may be said that they are composed of a *congeries* of lymphatic vessels—and it is conjectured that they effect some alteration upon, or that they are a sort of repositories for, the lymph; but their real use is not properly understood. There are numerous glands in the abdomen, termed the *mesenteric* glands, through which the lacteal vessels pass.

The *nervous system* is the most puzzling of all the systems in the body; it is composed of the *brain* and *spinal marrow*, and of innumerable branches of nerves, which either take their origin from these two organs, or are intimately connected with them. The brain is a soft structure of very complex formation, being composed of a great many different parts or portions, all more or less peculiarly organized; these different portions are all copiously supplied with blood, and some of them exhibit very peculiar appearances. The brain has been usually divided into two grand divisions, the *cerebrum* and the *cerebellum*:—The former is by far the largest portion, as it fills the whole bowl of the skull; it is also the most complicated in its structure: the latter is about the size of an orange, and is situated in the interior hollow of the *cranium*, immediately over the spine and neck. According to phrenologists, the *cerebrum* is the seat of the intellectual faculties, and of those sentiments and passions which are more or less under the influence of the reasoning faculties: the *cerebellum* is considered the chief organ of physical love. Both of these organs give rise to the different nerves which supply the whole body:—The nerves are small cords, resembling cat-gut, which pass out from the brain and spinal marrow by small holes or *foramina*, in or betwixt the different bones which compose the skull, and backbone or *vertebral column*. The nerves, like the arteries, diminish in size the farther they proceed from their origin, the branches being generally smaller than the trunks from which they shoot off; but their distribution is so varied

and minute, that it is quite impossible to present even a bare outline of it to the general reader. Suffice it to say, that every part of the body is so minutely supplied by the minute ramification of nervous twigs, that the point of the finest needle cannot be put into the skin without injuring some of them, as is shown by the sensation of pain which is produced. The nervous system is the source of all feeling or sensation, and of all power and action, in the animal machine. When a nerve is cut across, or otherwise injured so as to destroy its functions, the power, the motion, the action, or the feeling of the part is destroyed more or less, just according to the particular use or function of the nerve, and likewise according to its size and import in the performance of any particular function or action. Again, when there exists any disease or affection in a particular part of the brain, and if any nerves should arise from that part, their functions become either impaired or cease altogether. Of this we have an example in those cases of palsy in which individuals lose the power of speech, as also in some cases of blindness. But the most striking consequences arising from injuries, and from diseases, of the brain and nervous system, are those cases of paralysis or palsy, in which the one side of the body is more or less deprived both of the power of motion, and of sensation; and in other cases which affect the whole of the faculties together, as in complete apoplexy. All such cases arise from injuries, or disease, of the brain and nervous system; but we will have occasion to illustrate the subject still farther, when we come to speak particularly of different complaints and diseases.

Now, all the above-mentioned systems of organs and functions operate to one specific purpose, namely, the preservation of the body. We have seen that every organ, and every system of organs, has some specific purposes to perform in keeping up the perfect action of the whole machine; but there are some whose influence, and use, are

greater than those of others; but all are conducive to one great end, the support or continuance of life. And how is this great result accomplished? We have said that the nutritient part of the food is conveyed by the *lacteals* into the *thoracic duct*, and from thence into the blood, and that the blood is sent to the most minute extremities of the arteries. Now, the blood which goes out from the heart by the arteries is of a bright scarlet colour, but when it enters into the veins it is of a dark purple colour; this change, therefore, has taken place at the minute terminations of the arteries, namely, in the *capillary* vessels: so the legitimate inference is, that the blood is sent by the arteries to all parts of the body for its nourishment; for, after giving up its nourishing principles, it is changed into venous blood, and so returns back to the heart loaded with the *carbonaceous principles*, which it acquired in the capillary vessels. In consequence of thus being deprived of its nourishing principles, and of being loaded with carbon, it is sent, as we said before, from the right side of the heart through the lungs, where it is brought as nearly as possible in contact with the atmospheric air, to which it gives up its carbon, and at the same time has its vivifying principles restored by the change which is thus produced; and as the mass of venous blood is always receiving a fresh supply of prepared material from the *thoracic duct*, the blood is kept up in a state of constant renovation. The function of the extreme capillary vessels is to *assimilate* the blood to all the different textures of the body, for it is a law in the animal economy that the vessels of every particular structure deposit or lay down material for its constant support and renovation; so all the different functions of the body operate to this end, for it is by this that they are all kept up. But we now come to a very difficult part of the subject, namely, to the *organic vital operations* themselves—to those principles or *organic* actions which keep the whole system working, and which constitute the life or vital powers of the body.

An organic body endowed with vitality possesses certain properties of susceptibility, by which it is necessarily affected by surrounding agents, so as to give rise to particular effects upon its sensitive or nervous system. These effects produced upon the system at large, through the medium of the nerves, give rise to all those organic, instinctive, and voluntary actions, which characterize life or vitality. The organic actions or functions of a part, as manifested in all those movements and changes which are constantly going on in both the fluids and the solids, are those essential or primary vital attributes observed to exist in the very first manifestations of animal organization; and they exist in degrees more or less minute and complicated in every organic structure, according to the nature of the functions which it has to perform.

Every atom of animal matter being endowed with nervous susceptibility, is capable of receiving impressions calculated to excite its vital or organic actions; and thus the whole animal body, even to its most minute atomical parts, is a congeries of vital molecules. The vital actions of these minute particles or molecules, taken as a whole, may be termed the structural vital functions, because they preserve and renew the integral parts of all the different organs, and thus constitute the stimuli of their structural vitality.

Now, all the different organs in the body, besides possessing in common these atomical vital endowments which give rise to molecular organic action, possess an appropriate arrangement or organization of their component parts, so as to give rise to those particular vital functions which administer to specific purposes in the animal economy. Thus, the stomach and the other digestive organs prepare the food into nutriment for the nourishment and growth of the system. The lacteal system takes up the *chyle* or nutritient portion, and conveys it into the blood; the action of the heart propels the blood to all parts of the system for its renovation and support; and the lungs, by

their action, through the influence of the atmospheric air, free or purify the blood of certain principles which would prove inimical to the system if again circulated through it. These, and some of the others we have mentioned before, are the organic vital functions, and they all depend on, or are produced by, the particular structural adaptation of their respective organs.

These vital functions, then, as depending first upon molecular vitality, and second upon a peculiar structural arrangement, are the manifestations of *life and organization*:—Such manifestations are more or less perfect in all animated beings, just according to their rank in animated creation. Some animated creatures appear to be mere vesicles, capable only of absorbing, and of eliminating again, those substances by which they are kept alive and cherished; but the higher classes of animals, as man, possess many different functional organs, all of which minister to particular purposes for the nourishment and growth of their more complicated systems.

From the meanest vegetable to the zoophite, we have numerous grades of vital organization; and from the zoophite up to man there is an almost uninterrupted gradation of systems of more perfect vital organization, conjoined with animal life in all its varieties. As every grade, however, is endowed with the common principle termed *vitality*, it, of course, may be abstractly considered in relation to the whole as the grand characteristic of animated beings.

The question has often been asked, What is life? and much endless discussion has that question created. Like other principles in nature, we know that life has an existence, but we know nothing, so to speak, of its properties independent of its association with organized matter; and even of the nature of that association we know nothing either. The subject of vitality, therefore, can only be considered according to its manifestations in organized bodies, there being no other cognate data upon which we can found any investigations regarding its nature. So vi-

tality, or life, is only known as it affects and exists with organized matter, being no where discoverable without it. But although we are ignorant of the nature of the principle called life, its different manifestations are evident to our senses throughout the whole of the animated creation, from which we can judge of its relative attributes as connected with matter of that peculiar organization common to all living beings.

It may be asked, Since life becomes manifest in matter of a peculiar organization, when or at what stage of organization does life first appear? *Latent* vitality must exist in the veriest rudiments of animated beings; for, if the *embryo*, even in the earliest stages of existence, be injured to a material extent, life ceases; at least, the vital manifestations are not sustained by the influence of the usual exciting and fostering causes.

The manifestations of life, it may be said, are the result of the development of rudimental organization, endowed with latent vitality, from the influence of exciting or stimulating causes. For example, if a sound grain of seed, though it may have lain dormant for many years, be subjected to the influence of heat and moisture in a congenial soil, it will sprout up and grow into a plant of its kind. But if the seed were diseased, or if it were not subjected to the exciting causes of growth, it would either just dwindle away or remain in a dormant state. So it is with the germs of all vegetable and animal productions. Animation, or life, then, is purely the result of the operation of certain reproductive causes or influences on matter vitally organized. But this does not solve the query, What is life? nor does it advance us one step farther in explanation of its nature apart from matter, nor even regarding its association with matter. We witness in ourselves, and in other living animals, its various manifestations; we also know something of its stimulating or exciting causes, but of its real nature we have no idea whatever. Like gravitation, we know that it exists, but

whether as a distinct and independent principle, or merely as a sequence to certain organic changes or actions, we have not the means of determining. Gravitation is only known as the effect which one body produces upon another under particular circumstances; and life, or vitality, is only known in connexion with organized matter, as an effect or consequence of reproductive causes, produced by the mutual influence of organized beings. But although we are quite ignorant of the nature of life, we know something of those vital functions which are the direct stimulus or support of it; which knowledge is derived, as we have seen, from Anatomy and Physiology.* In the present introductory remarks we have given nothing more than a mere outline of the vital manifestations, or of those phenomena which characterize living beings. We will now consider more particularly the vital operations of the system as arising from nervous action.

Bichat, in his great work on *General Anatomy*, has classed all the vital operations of the body under two great principles, CONTRACTILITY and SENSIBILITY. Each of these great principles he has again divided into *organic* and *animal* contractility and sensibility; and *organic* contractility he has subdivided into the *sensible* and *insensible*.

Although this system of Bichat's has the merit of grouping all the vital operations under the above heads, they have been all treated of in different ways by other physiologists. The immortal Haller attributed all the vital operations to one principle, which he termed IRRITABILITY, which is a term of very extensive application, but which, of course, must be used in a modified way in relation to the different vital principles. As it is a very comprehensive and significant term, we may frequently make use of it in the course of our inquiries; for it will always be found very applicable to the doctrines of life.

* The popular reader, who desires a distinct and comprehensive treatise on Physiology, ought to consult the four numbers of the "Library of Useful Knowledge" on that subject.

As Bichat's system is rather puzzling, we will present it in a tabular form, as applicable to the principal vital functions.

## TABLE OF THE VITAL PRINCIPLES,

*According to Bichat.*

| | | | | |
|---|---|---|---|---|
| CONTRACTILITY, | *Organic* contractility, | Called into action merely by the application of a stimulus, and is more or less independent of the brain, | *Sensible* organic contractility, | Exemplified in the puckering and shrinking of the skin from cold, the vermicular motion of the intestines, the contraction of the heart, and the action of the lungs. |
| | | | *Insensible* organic contractility, | Exemplified in the movements of all the fluids throughout the system which give rise to digestion, secretion, excretion and absorption, &c. |
| | *Animal* contractility, | | | Exemplified in all the voluntary movements, and in those which are partly voluntary and partly involuntary, as the action of the abdominal and respiratory muscles in forced respiration. |
| SENSIBILITY, | *Organic* sensibility, or rather *impressionability*, | | | Is that property in living bodies which makes them susceptible of the appropriate stimuli of life—exemplified in all the vital operations of the system without consciousness. |
| | *Animal* sensibility, | | | Exemplified in all our sensations accompanied with consciousness or actual feeling. |

This ingenious system of Bichat's, then, classes all the vital principles under *Sensibility* and *Contractility*, and may be termed the classification of the functions of the whole nervous system in man. So these inherent principles, as demonstrated by Bichat, seem to be the essential attributes of vitality, being peculiar to all living beings, but of course existing in a more or less perfect state, according to all the varieties of animated creation.

A living being, then, whether vegetable or animal, is capable of receiving impressions through its nervous system from surrounding agents, and of responding to them either in a voluntary or involuntary manner, or in both. When the sun sets, the most of plants and flowers evince *sensibility*, in their leaves becoming partially closed or folded in ; and when, again, animals, and some vegetables, are touched, they cannot help evincing involuntary proofs of sensation. According to Bichat, these are the involuntary manifestations of *organic sensibility*, or rather *organic impressionability* and *contractility*, through the medium of the nerves of organic life. But voluntary motions in animals arise from a different set of nerves, namely, those which preside over *animal sensibility* and *animal contractility*, which system of nerves gives rise to volition through the conjoint operation of the brain with the nerves of sensation and motion. Again, those functions whose continued operation is necessary for the support of life, and which have been aptly termed *the vital functions*, are carried on by those nerves which preside over *organic impressionability* and *organic contractility*.

Now, this very comprehensive system of Bichat's is based on the principle of there being different sets or systems of nerves for different functions ; and such is really the case. The discoveries of Sir Charles Bell and Magendi have shown that we have distinct nerves for *sensation and motion and respiration* issuing from the spinal marrow. Then we have the great sympathetic nerve or ganglionic system, which seems to preside chiefly

over the functional movements of the body, as exemplified in *insensible organic contractility*. Then we have a set of nerves which arise from the base of the *brain*, and which preside chiefly over our *senses*—taste, smell, hearing, and sight. These may be termed the nerves of *appreciable sensation*, because their functions are intimately associated with cerebral or mental action. But nerves of *appreciable sensation* exist over all the body, for every different impression on any part whatever is attended with different appreciable sensations, and are responded to accordingly through the medium of the intuitive action of the brain.

Throughout the system, then, we have nerves performing very different functions, all of which are traceable to different purposes; but their conjoint operations are so complex, and so completely interwoven with one another, that the whole may be considered as one continuous and harmonious function of preservation. And as animated or organised beings are all more or less endowed with the above nervous principles; and as these principles are, of course, peculiar to living beings only, they may be justly considered the essential attributes of vitality.

Although it is generally allowed that some vegetables evince proofs both of sensation and of instinct, the most of naturalists and physiologists are of opinion that they do not possess a nervous system. Now, since it is established beyond the possibility of a doubt that the nervous system in animals is the source or medium of sensation, it is but reasonable to infer that vegetables are also endowed with some structure analogous, although they do not discover a regular system of nerves.

The step from vegetables to animals is almost imperceptible, for with the most distant recession from mere vegetation begins the most distant approximation to animalization; so the two extremes must be all but alike in their organization, and consequently in their functional operations. In the *Infusoria* the fluids are circulated through a reticulated structure, somewhat analogous to

the general structure of plants, and to all appearances possessing very similar vascular properties; and such may be the case in respect to the nervous system also; for in the *Acrita*, the lowest class of animals in which a nervous system can be satisfactorily traced, that system is found to consist only of simple filaments or fibres.

Although it is generally allowed that vegetables possess *instinctive* propensities, some are inclined to consider them as mere *mechanical* movements, not dependent on any appreciable organic susceptibility. Now, such a supposition is a mere opinion, given against real manifestations or proofs of the contrary; for, if we admit vegetables to be living beings, we must also admit that their movements are made through the impulsive operations of their vitality and organic sensibility. When we see an animal of any description making attempts at a certain purpose, we cannot help being convinced that it is the will of the creature to attain to it, and consequently we attribute all its efforts to its own will or spontaneity. The tendency of plants to grow in a particular way arises from their organic sensibility being peculiarly affected by certain influences.

Animals and vegetables possess in common the properties both of growth and reproduction, but the one is more located than the other. Animals search about for their food, and pursue all their instinctive habits in a manner uncontrolled; vegetables, on the other hand, derive their nourishment in a more limited way, being fixed, as it were, to one spot of ground, and all their apparent movements seem to be within their fixed limits. But vegetables, through their organic sensibility, shoot forth their roots in every direction where most nutriment is to be found; and it is well known, that, when any vegetable has overdrawn its source of nourishment, it attempts, if we may be allowed the expression, to shift, and, indeed, does shift, or shoot, its roots into new earth, thus deriving requisite support from new soil. Animals, through their instinctive desire for food, arising from their

organic and animal sensibility, can do no more; for, if a plant be situated in any place where nourishment can be found within the sphere of its capabilities of acquiring it, it will seek it out and live upon it accordingly, but if the food be beyond its powers of attainment, it will wither and die; and so it is with all animals.

And, again, all vegetables live and grow in a manner natural and peculiar to their vegetable and organic sensibility; for every plant, when it emerges above the surface of the earth, takes its own peculiar mode of growing. Some shoot forth into independent existence, and stand entirely by themselves; others, such as the hop, twist round something, and evince an intuitive or innate feeling for so doing—for all such plants travel upon the ground until they meet with such support, and if a hop be twisted or turned the contrary way from which the *sun apparently goes*, it will die.

Some plants evince certain intuitive or instinctive periodic movements at certain times of the day. For example, the water-lily shoots up its flower above the water about a certain time in the morning, and withdraws it again about a certain time in the afternoon; which regular change is said to take place from its innate reproductive powers exciting operations which could not otherwise be completed. In short, some plants evince similar instinctive propensities to animals, and we have no valid reasons for thinking that they are not endowed with appreciable sensation, equivalent to their various degrees of organization. As well might we argue that some of the inferior animals are void of mental action, because of its not being so perfect in them as it is in man.

All animated beings are links of one continuous chain of organization and vitality, for the various gradations, from the highest to the lowest, run almost insensibly into each other. Perhaps objections may be urged against this conclusion, in respect to the superiority of man above those animals which have been thought to possess an or-

ganization and mental faculties approaching somewhat to his own degree of perfection. No doubt man, and particularly in a civilized state, constitutes a link in the chain of animated creation, separated by wide differences from all those animals which have been considered as the closest approximation to him. But notwithstanding this, it must be admitted that the gradation from the lowest to the highest animated creature is all but regular, if we except man himself; and, even in making this exception, it must be granted that some of the lowest Negro tribes present many peculiarities, which constitute a striking approximation to the higher species of monkeys. However, there is one grand difference which constitutes a broad line of demarcation betwixt the two extremes, viz. the faculty of varied language and the power of abstract reasoning. Monkeys can *chatter* so as to be understood amongst themselves, as evincing certain desires from excitement or otherwise, and they also evince proofs of perceptive reasoning as affecting themselves; but so far as we can judge from their sameness of action, in respect to all their faculties, they do not seem to be possessed of those intellectual endowments, whose conjoined operations constitute a perfect mental system, as exemplified in man.

# CHAPTER II.

## PART I.

### On the Nature of Disease; and on Death, as arising from some of the Principal Diseases occurring in Mature Life.

*General Remarks on the Nature of Disease.*—The natural operations of all the different vital organs of the body are the direct support of life and health; and, whilst they continue in a regular and harmonious action, it may be said that the system is in a healthy state, and consequently may be considered as free from disease. Derangement of any of the vital functions always takes place from some affection or alteration of the structure of the organs whose functions are impaired; for, we generally find that according to the manifestations or symptoms of disease in any part, or organ, so is the derangement of its function. That derangement of function does occur without any appreciable manifestations either of change or of actual disease in the structure of an organ, no one will deny; but it must be admitted that, in consequence of the very minute, indeed we may say inscrutable, nature of the ultimate structure of the different textures of the body, it is quite impossible to discover with the naked eye any functional motions in the extreme secretory vessels either in health or in disease. So, if we admit the impossibility in the one case, we must admit it in the other, and consequently refer the difficulty to the inadequate power of our faculties to discover such minute differences. For example, in the very first stage of the commencement of an attack of inflammation of the eye, there is no perceptible change in any of its structures; there is, however, felt by the individual some pain or fulness about the part, which indicates

that all is not right. But in the course of an hour or two, perhaps, the eye begins to be very painful, and it becomes a little bloodshot; then the alteration of structure is perceptible, in the vessels of the part becoming so large, and so distended with blood, as to be visible to the naked eye. If the progress of disease in every organ of the body could be watched with the same facility of detection as that of the outer textures of the eye, we are inclined to think that every derangement of function would be found to have its antecedent derangement or alteration of structure. So, in speaking of derangement of any of the animal or vital functions, it should always be understood to imply that such derangement is only an effect, not the first cause, of the particular ailment. To take another example: An individual may for a considerable length of time have been complaining of bad digestion and all its train of capricious symptoms—in short, of great derangement of the stomach and bowels, with loss of appetite and increasing bad health. Now, such a case may have arisen from different causes—from errors of diet, from close confinement, from undue exposure and fatigue, or from any other irregular or pernicious effect produced upon the system. We shall say that, under such circumstances, and in that particular case, the stomach and bowels were the organs first affected. According to the constitution and temperament of the individual, the effect produced would vary: in some irritable constitutions the effects might be manifested in the symptoms of general irritation of the digestive organs, producing, perhaps, sickness, vomiting, and diarrhœa, with all the other concomitant symptoms of irritation of the stomach and bowels: in a less irritable constitution, again, both the primary and secondary effects would be quite different; there might be at first headach, and languor of the whole system, which might continue for a good many days; and, finally, there might occur all those *lurid* symptoms which are so characteristic of a depraved or vitiated condition of the secretory functions of the stomach, liver,

and bowels. Now, in both of these cases, the primary exciting causes of the complaints were the effects produced upon the different organs by the particular influences which we have mentioned; and these effects, again, were the direct cause of some changes taking place in their relative nervous and vascular associated functions. Such changes, then, must be considered as arising from an alteration of structure; for, if the structure of the organs had continued in a normal state, the functions ought to have been continued in a normal state also. Every different organ possesses a peculiar organization, calculated for the performance of certain functions; consequently, any decided change in the functions of an organ implies that there must be some corresponding change in its functional parts:—every disease or affection, therefore, originates in organic change of structure. The difference which exists, then, betwixt a healthy and deranged state of a part, or we shall say betwixt a healthy and deranged state of the system generally, constitutes the apparent symptoms or effects of bad health or disease.

Disease may be considered under two great divisions: namely, that which is curable and that which is incurable. Curable diseases are those affections which may have only gone on a certain length, the disposition of which being such that they may either bring about a salutary *turn* or crisis, or that their course may be checked and health restored by the judicious administration of medicines. Incurable diseases are the result of a morbid action having commenced in some particular part, which either has been allowed to run on too far, and thus become incurable, or to have been of such a disposition from the commencement as not to admit of any cure whatever, neither by the powers of nature, nor by those of medical art. For example, a common catarrh or cold, although no medicines have been used, generally runs a certain course, and gradually wears off, being cured by the natural *secretory* effects which are excited in the parts affected. But in some individuals the

attack may be so severe as to require the administration of medicine, either to subdue the violent action, or to hasten the secretory operations, which are the ultimate means of relief when the complaint is left to itself. Again, when some individuals take a catarrh or common cold, the effects are often such as to give rise to some particular action or disease in the parts most affected; hence the frequent occurrence of pulmonary consumption in individuals predisposed to that disease from the effects of cold: so we have curable and incurable diseases arising from the very same exciting causes. The ultimate consequences depend, first, upon the force of the primary impression of the exciting cause of the disease; second, upon the nature or predisposition of the individual part affected to take on a specific action or form of disease; and, third, upon the ultimate effects produced, by which the disease is rendered either curable or not, just according to its nature or particular disposition.

Besides diseases producing certain local effects upon particular parts, they also produce different general effects upon the system at large. Some diseases, say those of an inflammatory kind, generally produce great excitement of the whole system, and give rise to particular states, both of the solids and fluids. In inflammatory affections, in general, the blood is found to abound in those principles which arise from excessive action of the vascular system. Blood drawn in a case of violent inflammation exhibits a strong tendency to *coagulate*, or to form into a clot; and upon its surface there is formed a *buffy coat*, more or less concave or turned up at the edge, which is a decided characteristic mark of powerful inflammatory action. In such cases all the secretions of the fluids are more or less suspended—the chief action of the system being that of vascular excitement and vascular repletion or fulness. In low fevers, in the most of bowel complaints, and in nervous diseases, the action of the system is of the *irritative* kind; hence the various cachetic and languid

symptoms which accompany such complaints, and hence the want of vital tone in all the animal tissues and products. In such cases the blood is poor, and does not *coagulate* firmly; it usually presents a very mixed like appearance, its different parts being somewhat separated, resembling lees of wine: all the different secretions are likewise more or less changed, or depraved.

Besides diseases giving rise to such alterations of the blood and secretions as we have mentioned, some give rise to the deposition of morbid growths or substances. For example, cancer produces a particular morbid deposition, which seems to affect the surrounding parts, and ultimately the whole system itself. There are also many local affections or diseases which give rise to the formation of large tumours, some of which remain very harmless in their nature, whilst others again take on a morbid action, and thus come to affect the system in a serious way, from the morbid irritation and action which they induce. Every affection, however simple, tends to derange the system; for throughout the whole animal economy there is such an intimate nervous association betwixt all the different parts, that any irritation, however circumscribed, or slight, is quickly communicated to the system generally.

Since the nervous system is the medium through which all the bodily impressions are conveyed, it follows that every complaint must more particularly affect it: indeed, toward the latter end of every disease, the nervous system becomes so affected and deranged, that it may be emphatically said that death is the result of the cessation of their nervous functions. For, as the vital principle, or *vitality* of all animated beings, is supported or kept up by the different functional operations of the nervous system, it follows that, with the suspension of nervous energy, life or vitality ceases.

Death arises in various ways from particular affections of the nervous system. It may be produced from injuries of the brain, or spinal marrow, causing such derangement

of the vital functions as ultimately to end in death, either from the immediate or the consecutive effects of the injury. When an individual, for example, falls from a height, and pitches upon his head, and has a portion of his skull beat in upon the brain, death may ensue, or not, just according to the injury sustained. If the concussion, or shock, which the brain has received, have not been such as to suspend all at once its nervous functions, the individual may recover more or lessly rapidly, in accordance with the effects of the injury. But if the shock has been such as at once to suspend all the nervous functions, death, then, is the immediate consequence of the injury done to the brain. In all those cases which rally to a certain extent, the existing symptoms denote partial injuries only of the nervous system, and the individual may, or may not, recover, just according to the effects, both general and local, produced. Some cases of this description terminate fatally from the supervention of acute or chronic inflammation of the brain, in others death is the result of the primary effects produced, such as laceration and consequent effusion of blood into some part of the brain, causing paralysis of one or more of the *vital* organs. Certain poisons cause almost immediate death from their violent effects upon the nervous system. A drop of concentrated prussic acid put upon the tongue of a dog makes him drop down dead in an instant. And some of the poisons used by the savage tribes for poisoning their arrows, when introduced under the skin of a rabbit, for example, with the point of a needle, in a few seconds produce the most violent convulsions and death. A stroke of lightning causes immediate death from its exhausting the whole nervous energy of the system.

There are also instances on record of individuals having fallen down dead from fright, which must arise from the sudden effects produced upon the brain and nervous system. All fits or convulsions seem to be the result of irritation of the nervous system, and often end in death

from their violence. In apoplexy, water in the head, inflammation of the brain, and in all other *lesions* of that organ, the morbid symptoms are those which always characterise great nervous derangement, and, indeed, are the general concomitant symptoms of death in the most of diseases. It would be endless to trace all the symptoms of diseases to their termination in general nervous derangement, for such would be a complete treatise on the symptoms and course of every disease; but it may be laid down as an axiom—*That in all diseases the first and last effects are upon the nervous system.*

Diseases of long standing, such as protracted cases of consumption, arising from long-continued disease, either in the lungs or bowels, give rise to a gradual increasing weakness or debility of the whole system, both from the exhausting nature of the local disease itself, and from the constitutional effects which it gives rise to. In all protracted cases, whatever be the nature of the complaint, the vital energies of the system become exhausted, both from the effects of irritation upon the nervous system generally, and from the partial suspension of those organic functions which prove the stimuli, or support, of all the nourishing and vital operations of the body during a state of health. But there are many diseases which are accompanied from the very commencement with great prostration of strength, and apparent exhaustion of the nervous energy. This is particularly exemplified in low fevers arising from putrid exhalations, which seem to act principally upon the organic system of nerves, and which almost suspend their vital actions at the very first. In such cases all the symptoms are indicative of suppressed nervous power, the vital-stimulative, and nourishing, functions of the whole system being all more or less deranged, by the morbific effects of the poison upon the sentient organic nerves putting a stop to those organic actions which keep alive the vital functions. Every different disease, however, gives rise to symptoms and effects more or less peculiar to its par-

ticular disposition, always affecting the vital endowments, according to the importance and influence of the parts most affected.

The causes, or conditions, of disease are both of an external and internal nature. The former consist of all those impressions which are made upon the system by the influence of the various physical and moral agents by which we are surrounded; the latter may be resolved into those inherent tendencies to disease which often exist in different parts of the body, and which cannot be traced to any particular external exciting causes. These various causes of disease have been generally divided into the *remote* and *proximate*. The former embraces all the inherent tendencies to, and all the exciting causes of, disease; the latter implies the change produced, or the morbid action or disease itself.

As death arises from so many different diseases, it would be endless to trace its first or remote causes through all those various affections which are the direct consequences of morbid impressions made upon the system. As such an elaborate inquiry would tire and perplex the unprofessional, and as it would forfeit the object of the present work, we will only make a few remarks on the impression of cold as a very common exciting cause of disease, and especially of those of an inflammatory nature.

The impression of cold upon the animal body operates in various ways, just according to the state of the system at the time. One of the particular effects produced is the abstraction of the animal heat, or caloric. Cold conjoined with moisture has a powerful effect in lowering the nervous energy of the system, and, consequently, in suppressing the generation of that vital warmth which is necessary for the proper performance of the vital and animal functions. When the vital energies of the system are depressed, say from the influence of a cold and damp atmosphere, the body is rendered very liable to the accession of a great many complaints, all more or less characterized by a loss

of vital tone in all the organic functions. Thus low fevers, dropsies, catarrhs, chronic rheumatism, pulmonary consumption, dysenteric diarrhœa, palsy, conjestion of glandular parts (as manifested in *scrofulous* swellings, and scorbutic affections of the skin with general derangement of the different secretions), are all very common complaints as arising from a relaxed state of the system, through the influence of the continued impressions of cold and moisture. But the general effects of cold are often of quite a different nature. Dry cold acting powerfully upon any part of the body first tends to lower the animal heat, by its power of carrying it rapidly off, but in this way it acts as a stimulus to the organic actions of the parts; consequently the quicker the heat is carried off the more rapidly is it renewed, from the increased action excited in the surrounding parts. In some instances the evolution of heat, from the stimulus of dry cold from the contiguous parts, is so great that it gives rise to blisters of the skin, as is often observed in those inflammatory affections of the lips, followed by vesication, which are produced by exposure to a keen dry air, and which generally accompany dry catarrhs of an inflammatory kind. In such cases the effects of cold are chiefly of a local nature, and consequently do not affect the vital endowments of the system so as to lower its nervous energy, and thus render the body susceptible of taking on another morbid impression; so as to give rise to any of the particular diseases which we have mentioned.

The most dangerous effects of cold are those resulting from a determination of blood taking place to some internal vital organ; such is commonly the cause of those violent inflammatory affections which, as we will afterwards see, are very frequent causes of death. When an individual has been exposed for some time to a continuous impression of cold, the vital warmth and energy of the surface of the body is gradually reduced, the vascular action

of the parts not being capable of keeping up a constant evolution of animal heat and nervous energy. Such being the case, the cutaneous circulation and secretions are more or less suppressed, and there is consequently less blood circulating in the external parts of the body. Under such circumstances, the circulation of the internal parts becomes quite deranged; there is a greater supply of blood sent to particular organs than their eliminating functions demand; and the organic action being thus inadequate for its free transmission, distension and increased action of the blood vessels take place, which state gives rise to great local irritation, and to increased vascular action. These violent local effects again give rise to great excitement and increased action of the whole system, and the one reacting upon the other give rise to all those violent symptoms which generally accompany acute inflammation. Such are the general effects of cold in giving rise to the different diseases: but, of course, they are all more or less modified, according to the prevailing state of the system. During perspiration, the impressions of cold are very dangerous, from giving rise to a sudden suppression of that secretion, and, consequently, to an internal revulsion of the fluids. The impressions of cold, as we have mentioned, are the common causes of the most of acute inflammatory diseases, as affecting the brain, lungs, and bowels, but perhaps more particularly the two latter. However those inflammatory fevers, which are often accompanied with inflammation of the brain, very frequently originated in cold. The diseases of children can very frequently be traced to cold, as the exciting cause, especially during winter and spring. Indeed, the impression of cold is such a common cause of disease amongst children, that at least two-thirds of their complaints may be more or less ascribed to its influence in one way or other.

It may be laid down as an axiom, that cold, taken in the common acceptation of the term, is the most common exciting cause of diseases, particularly of those of an inflam-

matory nature; and that inflammatory diseases are the most common causes of death.

Since inflammation is such a very common cause of fatal diseases, it may be asked, What is inflammation—in what does it consist? Various definitions have been given of inflammation, but perhaps none are sufficiently explicable of all its phenomena. However, the following one may be considered as at least explanatory of its principal features.

Inflammation becomes manifest in any outward part becoming swelled and painful, and in being hotter and redder than in a natural state. These are the extrinsic symptoms of inflammation, or the external characteristics. The *intrinsic* nature of inflammation consists in the nerves of the affected part being in the first place irritated—in this irritation of the nerves of the individual part giving rise to excitement of the whole vascular and nervous systems—to distension and increased action of the vessels in the part affected—and, consequently, to great local determination of blood; hence the general swelling, the distension of the blood vessels, the redness, heat, and pain which usually accompany acute inflammation.

In London, according to the Bills of Mortality, about a ninth part of the deaths arise from specific cases of inflammation. More than one-half of this proportion consists of cases too miscellaneous to mention. The remaining half may be classed under the heads, inflammation of the stomach and bowels, inflammation of the brain, and inflammation of the chest.

The following Bill of Mortality, for London, from December 15, 1835, to December 15, 1836, will give the reader a very good idea of the prevailing diseases in the metropolis, with the amount of deaths from each disease:—

| Diseases. | Deaths. | Diseases. | Deaths. |
|---|---|---|---|
| Abscess, | 110 | Indigestion, | 10 |
| Age and Debility, | 2320 | Inflammation, | 1482 |
| Apoplexy, | 405 | — Bowels and Stomach, | 236 |
| Asthma, | 853 | — Brain, | 165 |
| Cancer, | 153 | — Lungs and Pleura, | 272 |
| Childbirth, | 172 | Influenza, | 5 |
| Cholera, | 2 | Insanity, | 206 |
| Consumption, | 3238 | Jaundice, | 35 |
| Constipation of Bowels, | 14 | Jaw, locked, | 6 |
| Convulsions, | 1617 | Liver, diseased, | 246 |
| Croup, | 169 | Measles, | 404 |
| Teething, | 393 | Miscarriage, | 16 |
| Diabetes, | 1 | Mortification, | 194 |
| Dropsy, | 847 | Paralysis, | 164 |
| ——— on the Brain, | 578 | Rheumatism, | 32 |
| ——— on the Chest, | 54 | Scrofula, | 29 |
| Dysentery, | 7 | Small Pox, | 536 |
| Epilepsy, | 24 | Sore Throat & Quinsey, | 36 |
| Erysipelas, | 75 | Spasm, | 59 |
| Fever, | 354 | Stone and Gravel, | 15 |
| Fever, Intermittent or |  | Stricture, | 14 |
| Ague, | 2 | Thrush, | 95 |
| ——— Scarlet, | 261 | Tumour, | 47 |
| ——— Typhus, | 59 | Syphilis, | 8 |
| Fistula, | 6 | Worms, | 17 |
| Gout, | 91 | Unknown Causes, | 1139 |
| Hæmorrhage (bleeding), | 33 | Casualties, | 439 |
| Heart, diseased, | 155 | Buried— |  |
| Hernia (rupture), | 10 | Males, . 9,202 |  |
| Hooping Cough, | 311 | Females, . 9,027 |  |
| Hydrophobia, | 1 | Total, . ——— | 18,229 |

Decrease in the burials reported this year, 3186.*

In the above Mortality Bill it will be observed, that but a very small proportion of the diseases are marked as inflammatory; the reason of which is, that all the rest are designated by particular names, which do not indicate the pathological nature of the disease at all, but merely the symptoms or the effects, as arising from certain peculiarities which are manifested in every different disease. Indeed, almost every disease mentioned above may in certain

* Johnson's Medical Review, July 1837.

stages be ranked as inflammatory. For example, *abscess, apoplexy, consumption, croup, teething, dropsy, erysipelas, fevers (inflammatory), gout, liver disease, measles, rheumatism, smallpox, sore throats*, and *quinsey*, with many others, may be all ranked under the head inflammatory, because they are all invariably accompanied with inflammation, or increased action, in some stage of the complaint, and require to be treated accordingly. So inflammation accompanies or gives rise to a great many diseases, which, in common language, are not considered as inflammatory: hence the very general adoption of *antiphlogistic* means of cure in the most of diseases. Even in some cases of very great apparent debility, bleeding and other similar means of cure are absolutely necessary. For example, in cases of the most dangerous inflammation of the bowels, and of the substance of the lungs, the general symptoms are indicative of great apparent debility.

Having thus briefly pourtrayed the general nature of disease, we will now proceed to consider more particularly some of those diseases which are the most common causes of death.

*Inflammation of the Chest.*—The proportion of deaths from inflammation of the different vital organs within the chest is by no means so great as we would be led to suppose, for in no other cases of inflammation is medical treatment so decidedly advantageous in promoting recovery. Such being the case, the proportion of deaths is very small compared with that from inflammation of the bowels and brain.

In adopting a comprehensive view of inflammation within the chest, we will consider it, 1st, as affecting the membrane called the *pleura*; 2d, the lungs; and 3d, the heart and its appendages or contiguous parts.

The lungs are large spongy bodies, filling nearly the whole capacity of the chest, and traversed in every part by blood vessels and air tubes. They are loose and floating, being only attached at the back part along the spinal

column. Their office is to purify the blood as it comes from the heart, after having circulated through the body. As the nature of their function or use in the animal economy requires that they should be quite free in their action, they are covered, we may say enveloped, by a very fine membrane, the *pleura*, which lies smooth over their whole surface—embracing the lungs and heart in one common *capsule* or bag. This membrane or covering is united in its two folds at the back part of the lungs, and binds them down to the spinal column. It is again reflected from this, and lines the whole inner surface of the chest; in short, duplicating the lungs and heart in such a way as to isolate them completely in their respective motions.

*Pleurisy, or Inflammation of the Pleura.*—When the *pleura* becomes inflamed, there is always great difficulty in breathing, accompanied with acute pain in some part of the chest, which is greatly increased by the patient taking in a long breath or full inspiration. This pain arises chiefly from the motion of the ribs over the affected part, and from the expansion of the lung within during the inhalation of the air. We have said above that the *pleura* envelopes all the different parts contained in the chest, in order that the action of one part may not interfere with that of another; and it likewise secretes a watery fluid, which keeps all the surfaces moist and easy for their proper play. Now, it is a law in the animal economy, that when a *serous* membrane, such as the *pleura*, becomes inflamed, there is always a tendency to an alteration in its secretion. Sometimes the fluid is secreted in large quantities without any great change in its properties, being only more abundant, and perhaps of a more consistent and more tenacious quality. But the most common occurrence in this complaint is a throwing out of a very tenacious fluid, which is called *coagulable lymph*, which glues, as it were, the corresponding surfaces of the membrane together. Thus, the free surface of the membrane lining the

chest becomes attached to that which covers the corresponding part of the lung. This attachment of the two surfaces grows firmer and firmer with age; consequently, every person that has had a pleurisy is likely to have such adhesions; but partial adhesions of this kind do not give rise to much inconvenience. Such is generally the termination of active or acute inflammation of the *pleura;* but, when the inflammation is of the *chronic* kind, there is a gradual effusion and accumulation of this fluid, producing what is usually termed *water in the chest,* and which is invariably a fatal disease. In other cases of *pleurisy,* the inflammation extends to the substance of the lungs, giving rise to such engorgement of blood in their different parts as ultimately produces complete suffocation. This particular inflammation of the chest may also terminate in the formation of matter in the lungs, which universally ends in hectic fever and death.

*Pneumonia, or Inflammation of the Substance of the Lungs.*—Inflammation of the lungs is a much more fatal disease than *pleurisy,* being more insidious in its attack, and much more rapid in its course. Its invasion is often very obscure, the patient complaining only of languor and slight difficulty of breathing, with perhaps a slight pain in some part of the chest, occasionally shooting to the back of the shoulder. The pulse is in many cases not very quick, the cough is trifling, and, altogether, a superficial observer would consider very little wrong; but very soon the countenance assumes a serious aspect, the breathing becomes more difficult, the pulse is small and quick, the skin has lost its healthy hue—all betokening a rapid sinking of the vital powers. Such alarming changes throughout the system are the direct consequences of the fatal ravages of the disease. The lungs are the organs which purify the blood for the nourishment and growth of the whole body; so, when their function is thus materially impaired, the whole system very soon suffers to a dangerous extent. The blood, during a healthy state of the lungs, is propelled

into their minutest vessels to be purified by the influence of the air. Now, no sooner does inflammation of the substance of the lungs take place than these minute vessels participate in common with all the other parts—the swelling and engorgement become such that their power of circulation ceases—the blood becomes stagnant in different branches of vessels—the stagnation increases and extends to other ramifications—the engorgement becomes more and more general, and all the pulmonary vessels and air tubes affected have become so sealed up that there is little or no passage either for the circulation of air or blood; in vain does the chest heave, and the nostrils expand—the lung has become almost a solid mass—all its beautiful adaptations for the purification of the blood are gone—the vital stream is all but stopped in its course—the suffocation becomes imminent—and the patient dies.

*Inflammation of the Heart.*—We have mentioned that the *pleura* also forms a covering for the heart. Now, this portion of it sometimes becomes inflamed, and, when it continues for any length of time, it generally gives rise to very serious diseases of the heart itself. The origin of diseases of the heart, however, is often very obscure, therefore we cannot speak very particularly of their first symptoms. In general, inflammation *about* the heart is characterised by a quick-going pulse, with more or less palpitation. The patient may not suffer a great deal at first, but in course of time the symptoms become more manifest, and the sympathetic effects more severe. There may be, along with the palpitation, a great tendency to fainting, with difficulty of breathing upon the slightest exertion. The face is often swelled and livid toward the later stages of the disease, although in many cases the skin and countenance are, for the most part, pale, and possessing rather a waxy appearance—the expression of the countenance is particularly anxious, and peculiarly expressive of something very far wrong. Indeed, there is a placid melancholic look that cannot fail to strike the observer, as being

the external solicitor for sympathy and inquiry, regarding an intractible and fatal disease. With these symptoms the patient may live for a considerable time, but ultimately they become aggravated in all their forms, and dropsy, either general, or of some particular part, takes place. The heart then gradually becomes less able to receive or propel the blood, in consequence of which all its fluid parts become more and more effused throughout the system —the lungs become engorged, their functions being more and more impaired—the heart gets rapidly weaker in its actions, along with that of all the other vital powers, until the current of life is completely ebbed in the last convulsive throw of an overpowered organ.

*Death from Consumption.*—About one-sixth part of the deaths in the whole population of London arises from consumption, or what is technically named *phthisis pulmonalis.* That consumption of the lungs should cut off such a great proportion of the people may appear rather striking ; but, when we consider the important office which the lungs perform in the animal economy, we need not be surprised at this amount of mortality from what may be called an universally fatal disease. Some of the most talented of medical men have advocated the curability of consumption ; but, if general facts be ranged against special cases, such statements will weigh very little against either public or professional experience as to the incurable nature of the disease.

The climate of Great Britain is very favourable to the development of consumption in all those the least predisposed to it. This may be owing to the changeable state of the atmosphere, both as regards heat and cold, and the great quantity of moisture with which it is generally charged. That a moist atmosphere, with sudden changes in temperature, is apt to give rise to the development of consumption, is evident from its prevalence in low lying, damp, unhealthy districts. But consumption of the lungs may take place in any individual, if certain circumstances

have brought the pulmonary system into a state susceptible of its exciting causes. It is well known that even the most healthy cows, when taken from the country and confined to close byres in town, become affected with *phthisis*, or have the development of the consumptive tubercle on their lungs.

Now *phthisis* consists in the development or formation of small bodies in the lungs, called *tubercles*, which minute bodies are of a cheesy consistence, of a greyish colour, and about the size of mustard seed. When these small bodies begin to form, more or less irritation is always set up in the chest; hence the trifling tickling cough which always ushers in the first stage of consumption. As the tubercles become more numerous, the cough becomes more constant and more violent—being sometimes rough, and often accompanied with hoarseness. As the development of the *tubercles* proceeds, the cough gets more and more incessant, and the breathing becomes much more difficult, from the compression of the minute air cells and blood vessels, by the rapid development of tubercles. From this partial stoppage of the circulation through the lungs, the whole system becomes much affected, and hectic fever is established, with its well known symptoms, night sweats, rapid pulse, and progressive emaciation. During the development of all these fatal symptoms, the patient has no idea of his dangerous state:—Hope has cast a shadow of assurance over all the effects of the preying disease. Indeed, we may well say, with the poet, that in such cases hope

"Lights the lamp at Nature's funeral pile."

How anxious and how earnest is the patient all the while regarding recovery!—he feels no inward pain—has no mental alienation—has a tolerable appetite—and, to use his own words, feels "only weak from the long-continuance of his cold." Under the deceiving influence of these vain hopes and delusions, the patient is quite unconscious

of his approaching doom. Slowly, but steadily, the disease steals on—the cough becomes deeper and deeper—the emaciation increases—the night sweats become more and more profuse—the skin looks pale and of an unhealthy hue—the hectic flush of the cheek is now confirmed—the features have become sharp and moulded to the bone beneath—the expectoration suddenly increases—and all the vital powers rapidly give way. Hope may now, for the first time, be overshadowed by the anticipation of death; but, ere full consciousness of approaching dissolution has taken possession of the mind, death has laid his iron grasp, and hurried his victim beyond the hopes and fears of an earthly state.

In 1838, the deaths throughout England and Wales, from consumption, amounted to 27,754, or one-fifth part of the whole amount of the deaths.

Consumption is more prevalent in some of the *districts* in London than in others. The following table by Mr Farr, shows the proportion of deaths from consumption to the whole amount of the deaths, and also to the living:—

| | Districts 1-10. | Districts 11-20. | Districts 21-30. |
|---|---|---|---|
| "Proportion of Deaths by *Phthisis* in 100 deaths, | 14.4 | 15.8 | 16.4 |
| Annual Deaths by *Phthisis* out of 100 *living*, | .478 | .451 | .354."* |

In the above table the *mean* proportion to the whole number of deaths approaches pretty nearly to one-sixth, which agrees with what we said before; and the annual number of deaths, from consumption, appears to be just about 4½ to every 1000 of the *living* in London.

We are inclined to think that a great many more die from consumption in England than in Scotland; and we shall afterwards see that a great many more die from fever in Scotland than in England. According to the Report

* Report of the Registrar General, 1839.

of the Registrar General, throughout England, as we mentioned above, about one-fifth of the whole mortality arises from phthisis. In London, fully one-fourth of the deaths arises from consumption; and in Liverpool, Manchester, and Leeds, the proportion is nearly one-fourth. Different trades have a decided influence in predisposing to consumption; but this we will consider in another chapter, when we come to speak of the influence of different trades and professions in giving rise to particular diseases.

*Death from Asthma.—Asthma* is a disease particularly fatal to old individuals. It has been commonly divided into two kinds, the dry and the moist. The dry asthma consists in the sudden accession of great difficulty of breathing, which may continue for a consierable time and then go off entirely; it may either come on in paroxysms at different times in the day, or recur periodically, generally at some hour during the night-time. Asthma recurring periodically has been considered of a spasmodic nature, owing to some spasm of the *bronchi* or air tubes; but of this there is no certainty; for it is very difficult to comprehend the nature of a spasm, so general in its effects, and without giving rise to some *distinct* spasmodic pain referable to the seat of the affection.

Recent investigations have shown that asthma arises from a great many different complaints of the chest; and it is well known that its attacks are generally brought on by changes in the atmosphere. So those subject to asthmatic attacks have always some affection or other of the air tubes. When such individuals have been exposed to any exciting cause of the disease, the lining membrane of the *bronchi* either becomes so inflamed or altered, as to bring on a fit of the difficulty of breathing. The laborious breathing in asthma is *generally* owing to a conjestion or swelling of the mucous membrane of the *bronchi*, and to the accumulation of phlegm in these passages. In the most of cases, at first, the symptoms are usually pretty moderate; but, as the disease becomes confirmed, every

successive attack is more severe; and, as the individual gets older, the respiratory muscles become less able to expand the chest—the difficulty of breathing is much increased—and the whole system is consequently quite overcome by the extreme exertion. The digestive organs then become impaired from deficient nervous stimulus—the appetite rapidly diminishes—a very abundant secretion of mucus takes place into the *bronchi*—and the whole of the vital powers are so reduced that the patient cannot expectorate freely. In the last stage, a clammy sweat bedews the whole skin, which has acquired a cadaverous hue—the *rattle* in the throat becomes louder and louder—the suffocative phlegm or mucus rapidly increases—a deep sigh is heaved, and the individual expires from suffocation. Such is the *usual* termination of asthma.

*Death from Water in the Chest.*—The symptoms accompanying water in the chest often resemble those of asthma, so far as they are characterised by difficulty of breathing; but the breathlessness in water of the chest is generally pretty constant, whatever be the state of the atmosphere. Along with the difficulty of breathing, there is always an indescribable anxiety on the part of the patient about his complaint. The nights are for the most part restless, and the patient requires to sit constantly up in bed, the difficulty of breathing being always increased by the recumbent position. Sometimes the patient can lie best on the one side, which happens when the water compresses the one lung more than the other. Water of the chest is essentially the consequence of some organic disease. It very often arises from affections of the heart, but most commonly from chronic inflammation of the *pleura*. We have mentioned, in speaking of *pleurisy*, that, when the *pleura* becomes inflamed in a chronic way, its secretion is generally much increased, giving rise to an accumulation of water within the chest. This often takes place, and again becomes absorbed in young sub-

jects; but when the individual is up in years, and the powers of absorption not adequate to take up the quantity of fluid effused, the effusion into the chest gradually increases. Now, as the lungs and heart completely fill the chest, any effusion there must greatly impede their actions, and that in proportion to its extent. The lungs, being thus pressed into smaller volume, are unable for the adequate performance of their functions in purifying the blood. In consequence of the blood being imperfectly purified, the whole system begins to fall off—sleep almost entirely forsakes the patient—the irritability and anxiety become extreme—the chest *appears* swelled, and the heart is generally very irregular in its actions—and great dropsical swelling of the extremities and other parts ultimately supervene. The patient cannot bear to be turned nor moved, but sits in bed supported by pillows, with the head half drooping, and with a very listless expression of the countenance. In this state he may linger for days, but, perhaps when least expected, suddenly expires.

*Death from Dropsy of the Abdomen.*—Dropsy of the belly or abdomen is much more common than that of the chest. It consists in a collection of water in the cavity of the abdomen. The whole inner surface of the belly is lined with a thin membrane, possessing similar properties to the *pleura* which lines the chest. This membrane, which is called the *peritoneum*, after lining the walls of the *abdomen*, is reflected from the spine over the bowels, thus forming their outer and entire covering. The *peritoneum*, like the *pleura*, secretes a watery fluid, which lubricates all its free surface. Now, this secretion is apt to be increased from a good many different complaints, but particularly from organic affections of the liver, accompanied with increased action of the vessels of the *peritoneum*. It is also often increased from inflammatory affections of the membrane itself. In short, numerous diseases of the abdominal viscera may give rise to this watery effusion, thus producing what is generally termed dropsy.

When the secretion begins to accumulate, the abdomen gradually swells in every direction; and, as the swelling increases, all the other secretions become affected in their turn—the bowels are much dried up—the secretions of the skin and kidneys are likewise very much diminished—there is a dry feverish heat, with quick pulse—and the breathing becomes difficult and often very laborious, in consequence of the constant pressure of the fluid upwards upon the chest. In this state the patient may continue for a considerable time; for it would appear that Nature sometimes limits the effusion, and in many cases it is kept in check by the judicious administration of proper remedies. Drawing off the water, or *tapping*, is oftener resorted to in this species of dropsy than in any other, and occasionally it is attended with great temporary relief, especially when followed up with a judicious course of medicine; but in most cases the swelling, with the effusion, returns.

The successful treatment of dropsy depends entirely on the removal of the cause. If the first cause, or primary disease, be of an incurable nature, all means used to diminish the effusion will be of no avail. The primary disease will be exerting its baneful influence over the whole body, whilst the dropsy, or secondary disease, is also lowering the vital powers, from keeping up a constant drain and irritation of the vascular and nervous systems respectively. In short, the disease becomes too much for the bodily powers to stand against—the strength gradually gives way—a universal relaxation of the whole frame ensues—a swelling of the face and extremities takes place—and the patient dies gradually exhausted.

*Death from Inflammation of the Stomach and Bowels.*—Inflammation of the abdominal viscera is not so frequent in occurrence as that of the organs of the chest. This circumstance is owing to their not being so directly exposed to the influence of changes in the atmosphere, and other exciting causes of inflammation. But very frequent-

ly, indeed almost always, inflammation of the bowels may be traced to cold, got some way or other, generally from damp feet. Inflammation of the stomach may exist without that of the bowels, and the bowels may be also affected without the stomach. When the stomach is the chief organ affected, at first there is pretty smart fever, quick pulse, red tongue, and pain in or over the stomachic region. But in the most of these cases the intestines themselves are very soon affected—their lining or mucous membrane becomes inflamed, which is followed by diarrhœa, and all the other symptoms which usually accompany severe inflammation of the bowels. But if the inflammation has commenced in the *peritoneum, or outer covering of the stomach and bowels*, the symptoms are very different, for the complaint goes on, ends, and must be treated in quite a different way. The variety of symptoms occurring in the course of abdominal inflammation renders it quite impossible to give a satisfactory account of the disease in this work; and although all the symptoms were entered into, and their causes fully explained, they would neither be relished nor understood by the unprofessional reader; we will, therefore, limit our observations to a mere outline of the most common features of inflammation of the bowels generally.

When the inflammation is fully established, the patient always refers to uneasiness or pain in the belly. There is often vomiting, but usually only an inclination to retch: the appetite is almost gone, but there is usually a great desire for cold drinks—the tongue is red, with a dryness of the mouth—the lips are parched and shrivelled—the pulse is small, quick, and feeble—and there is always great anxiety of the countenance. As the disease goes on, all the symptoms become rapidly worse—the body gets emaciated, and the skin assumes an unhealthy sallow hue. The patient now refers more to the seat of the disease—the pulse gets quicker and more feeble—the appetite is all but gone—the countenance is particularly

anxious—and "the lips are moulded into a bitter smile." In the last stage the emaciation is extreme—the features are completely collapsed—the tongue and mouth are covered with black *sordes*—the eyes have ceased to glisten, being red and suffused—there is a low muttering delirium—the patient lies on his back quite sunk and emaciated—the pulse is faltering in its beats, and almost imperceptible—the breathing is difficult, and perhaps stertorous—the countenance is ghastly in the extreme—the sufferer heaves one or two deep sighs as he slides from the melancholy state of his existence. Such is an imperfect account of the symptoms of this very fatal complaint. After death the bowels are often found to be completely ulcerated, glued together, and affected in different ways, according to the nature and seat of the disease. In England and Wales about 10,000 die annually of diseases of the stomach and bowels and the other digestive organs. These diseases seem most fatal to males, being as 1.5 in the males, and as 1.3 in the females, out of 1000 living.*

*Death from Disease of the Liver.*—The liver, like all other organs of the body, is liable to different diseases. The most common are inflammation, and *scirrhus* or hardening of its substance. Inflammation of the liver is much more common in hot countries than in temperate climates: indeed, this seems to be the case as regards all affections of this organ. The office of the liver is to secrete the bile. Now, heat seems to produce a tendency to a greater secretion of bile, consequently the action of the liver must be greater in warm countries than in colder ones.

Inflammation of the liver is usually accompanied with pain in the right side, beneath the ribs, which is often felt shooting to the shoulder of the same side. The pain may be severe or not, just according to the acuteness of the

* First Report of the Registrar-General, 1838.

inflammation. In liver disease the skin and eyes are generally of a yellowish hue, there is little appetite, and the patient is sensible of getting daily weaker.

As the disease advances a swelling or hardness generally exists in the region of the liver—a darting pain is usually felt in the shoulder—the emaciation daily increases—and altogether the patient assumes a very unhealthy and sallow appearance. In the last stages of the disease dropsy of the belly, with watery swelling of the extremities, supervenes, and the patient dies with all the symptoms of confirmed dropsy. After death the liver may be found very much enlarged, soft, and easily torn; or it may be smaller than in health, but studded over with numerous tubercles. In other cases the inflammation may have been so violent as to cause suppuration in its substance, there being often found very large abscesses, which may have burst either externally or internally. Such changes in this important organ must render it entirely unfit for the performance of its functions.

*Death from Apoplexy and Palsy.*—It is generally thought that apoplexy and palsy are *now* of more frequent occurrence than formerly, and very likely this popular opinion is quite correct; for just in proportion to the advances of refinement do we depart from the natural ways of living, and consequently render our bodies more liable to particular diseases.

Every individual has a peculiar constitution or temperament coeval with his birth. If his habits of life and mode of living be unfavourable to a healthy and regular development of his body, some part will overshoot the rest, either from being over nourished or over stimulated, and thus take on a morbid action or tendency to disease. But there are some who seem to be born with that peculiar state of the brain and nervous system, which renders them liable to apoplexy and palsy; for even the most temperate often die of these affections. It appears, however, that in the most of cases the exciting cause is intemperate or excessive living; for

individuals who eat well and drink great quantities of spirituous liquors are generally those most liable to, and most frequently taken with, the disease. Indeed, when we see a person rather up in years, with a very thick overgrown neck, red face, and other marks of fulness about the head, we are irresistibly led to think that such a person shall die from apoplexy.

Apoplexy consists in a quantity of blood, or fluid—the *serum* of the blood—being effused or thrown in upon some part of the brain. When blood is effused, it is called *sanguineous*, when *serum*, it is called *serous*, apoplexy. Now, these two different kinds of the disease usually arise from very different causes. The sanguineous apoplexy attacks those of a full habit, as described above; but the serous kind, again, occurs in individuals rather of a spare habit, whose bodies may have fallen off from declining years. So apoplexy may be either the result of overgrowth or of depletion; consequently, there must exist some predisposing, or, in plain words, some acquired or *natural* state of the brain, to favour the occurrence of the disease. This state may be either owing to a weakness of the vessels of the brain, or to a relaxation of the substance of the brain itself.

In palsy, or paralysis, of different parts of the body, the cause is always some affection either of the brain or spinal marrow; and the extent and nature of the palsy is just according to the particular part of these organs affected. When the lower part of the spinal marrow is the seat of the disease, the palsy is confined to the legs and that portion of the body supplied by the nerves arising from the part affected. When the upper half of the spinal marrow is the seat of the disease, the paralysis is more generally diffused over the body—the arms, trunk, and lower extremities being all more or less seized. In some cases, there is more a loss of sensation than of motion, and *vice versa;* which shows that there are nerves for sensation and motion, and that these different nerves are more or less affected in

different cases. Now, we have said that different parts of the body may be paralysed individually or conjointly, just according to the seat of the disease in the spinal marrow. But we have yet another kind of paralysis, which affects the entire half of the body—disabling the individual on the *one side* only. This species is more allied to *apoplexy* than the other: for the whole one side of the body, from the crown of the head downwards, being paralysed, shows the brain must be very much affected; for, as the spinal marrow and all the individual branches of nerves which supply the face and head arise from the brain, their paralysis indicates distinctly some affection of their prime origin. But we have also cases of paralysis of the one side of the trunk, in which the head is not involved—showing that the spinal marrow, and those parts of the brain from which it takes its origin, may be affected without involving those particular branches of nerves which supply the face and head, and which issue individually from different parts of the brain itself. These different kinds of palsy are all well known from their different manifestations or symptoms. Their occurrence under any form is always alarming, and is too often the precursor of more severe attacks.

A complete stroke of apoplexy comes on very suddenly. The individual may have been observed to trail his feet a little, and to falter in his speech. All of a sudden he falls down in an unconscious state—the face has a purple, turgid appearance, all the veins being gorged with blood—the eyes are fixed, the pupils are insensible to the light, and the lips are relaxed and livid—the mouth is drawn to the sound side, and all the other side is more or less paralysed. Both sides of the body are seldom affected at the same time. When such is the case, the individual is rendered completely insensible; but when the attack has not been so very general, there may remain some degree of consciousness, and the patient may survive, and even regain a partial use of his faculties. But when both halfs of the trunk and head are affected at first, or if the one half

should soon follow the other, as is often the case, then the individual is found to be completely insensible, and recovery is beyond all hope. When both sides are affected, the patient is laid completely prostrate. All his powers of motion and sensation seem to be entirely suspended—he lies on his back, an unconscious being of all that is going on around—his breathing is loud and stertorous—his lips, if we may use the expression, are lying loose upon his breath—the pulse is strong and quicker than natural—and, only for the sudden change and other circumstances, one would be apt to suppose him in a deep sleep. In this state he may continue for a good many hours; but the breathing becomes more oppressed, the pulse gets weaker, two or three quick fetches of the breath are given, and the individual expires.

Various appearances are discovered after death from apoplexy. The most common is the effusion of blood into some part of the brain. It may either be found nearly in its fluid state, or in a *clot*, just according to the length of time intervening between the first of the attack and death. In other cases, *serum* only, the watery part of the blood, is found effused, which usually happens, as we said before, in very aged persons of a thin habit of body. In both cases there is always some alteration of the substance of the brain itself surrounding the effusion—generally *softening*—which, in all probability, is the cause of the disease.

*Death from Mortification.*—Almost every part of the body is liable to mortification, and it often occurs in the course of a great many different diseases. When the system is in a depraved or very irritable state, violent inflammation is very apt to end in gangrene or mortification, which arises from the inflammation running so high as to render the part unable to continue its vital actions—so sloughing or gangrene is the consequence. However, certain parts may slough in a mortified state, without at all affecting the system at large, or without any great

derangement of the system having preceded the sloughing; but such sloughing is quite different from gangrene, it being merely the result of *local* increased action, without any particular tendency to *gangrene* in the rest of the system.

When a part becomes completely gangrenous, it assumes a yellowish green colour, with a good deal of surrounding inflammation. The patient has a very quick irritable pulse, hot skin, and furred tongue; he is restless, and troubled with hiccup, and the countenance evinces considerable anxiety. If the mortification be of any internal part, these symptoms are all very marked. The termination of cases of mortification is generally very deceiving; for, often just immediately before death occurs, a sudden remission of all the alarming symptoms takes place, and the patient expires when all his relations may, for the time, be most hopeful of his recovery. This remission is certainly very deceiving to the relations and others waiting on, but seldom does it delude the attentive medical attendant.

A peculiar kind of mortification often occurs in old people. For example, a very old worn out thin person may complain of great pain in one or both feet. After a time a livid spot makes its appearance, probably on the ball of the big toe. This spot gets larger and larger, and soon assumes the true character of gangrene. It then spreads up the foot and leg, continuing with all its virulence, until, by its irritation and bad effects upon the system, it completely wears out the sufferer. These are very melancholy cases, and show, in the most decided features, the desirable relief often afforded by death. The cause of this mortification is a stoppage of the circulation from *ossification* of the arteries.

*Death from Fever.*—There are a great variety of fevers which have been generally classed under the head of typhoid. There are, the mild typhus, the severe or low typhus, the spotted fever, the jail fever, the ship fever, the

camp fever, &c. &c.—all of which are characterised by those symptoms to which the term typhoid is applied. It is quite impossible, in a general treatise like this, to give the reader any idea of the many modifications and types which this important disease assumes, and of the many different causes of death in all its varieties. We shall, therefore, give only a short account of the usual course of typhus fever, as it occurs in our own islands and in other countries as an endemic disease.

Fever generally commences by a person feeling himself rather unwell; he has an unusual degree of languor and listlessness about him, and, upon the whole, cannot say what is really the matter, but he feels himself not right, has little desire for food, and, in spite of everything, looks dejected. He then feels a pain in his back, which is soon followed by a shivering, he is unable to sit up, and, the fever being now formed, he is obliged to take to bed. Such are the symptoms which usher in the first stage of typhus fever. In the second stage the general depression of the whole bodily powers rapidly increases—the pulse ranges from a hundred to perhaps a hundred and forty—the tongue is dry, and covered with a dark brown *fur*, and the teeth and gums are also encrusted with a black secretion—the skin is sometimes clammy, though for the most part it is dry and harsh to the feel, and has a dirty and unhealthy looking hue—all the secretions are depraved and altered, and there is generally more or less delirium or incoherence. These symptoms may continue for a fortnight or three weeks, without any very material alteration, excepting the patient's increased weakness, and, perhaps, complaints from pain of the bowels or of other parts. About the end of a fortnight, or three weeks, he appears much worse, being very low, almost constantly insensible—lying on his back with his mouth and lips black, and altogether appearing very bad. Of a sudden he becomes a little restless—a sweat breaks out—his mouth and tongue begin to clean—his pulse is not so quick—he asks for something, and from this time

he gradually recovers. Such is the usual course of a case of typhus fever ending favourably. But, alas! too often does it run a very different course, proving alike fatal to the feeble and the strong.

When a healthy crisis, at the end of the second stage of the fever, does not take place, all the symptoms become greatly aggravated, for generally some important vital organ, as the bowels, lungs, or brain, begins to suffer from the effects of the disease. When great changes are about to take place in any important part, the general symptoms are often very deceiving; for it is always sometime before the manifest symptoms of the local disease supervene: hence the great necessity of watching earnestly for the slightest indication of any local complaint. From the frequent occurrence of serious local diseases in the course of fevers, some of the most talented medical men are of opinion that local affections are always the primary cause, but such is surely not the fact; for, in the great majority of cases, throughout the whole course of the fever, we have no very marked symptom of any violent local disease. However, it may be laid down as an axiom, that all fevers terminating in death do so from the occurrence of organic disease in some one or other of the vital organs, or in some important part of the body.

When there does exist any very severe local complaint in fever, its ravages tell more and more upon the system in proportion to its severity and the importance of the part affected. This, superadded to the effects of the fever, renders the case very hopeless; for the system is now quite inadequate for the means which would be required to subdue the local disease. The patient is therefore almost a total wreck in the tempest of a raging fever—his system has undergone all the privations of protracted suffering in the continued storm of typhus, and, being now assailed by one severe attack of local determination, is no longer able to resist the shock—the frail tenement gives way to the conflicting currents, and the patient breathes his last, it may be, amidst the jarring of many diseases.

After death, the marks of disease may be found in a great many different parts. It would appear that fever brings the system into such a state as to render it liable to the occurrence of many different local affections. In one case the chief disease may be in the bowels, in another in the brain, and in a third in the lungs; and in other cases, again, there may be affections of all those different parts. Such is very often the complicated nature of the termination of fever.

When the brain is the organ most affected, there is always more or less delirium at first, which, if the morbid excitement does not subside of its own accord, or is not subdued by medical means, ultimately ends in low muttering delirium, *coma*, and death.

When the lungs are the organs most affected, there is increasing prostration of strength, accompanied with a very cachectic state of the system, and with more or less heaving of the chest from the difficulty of breathing. Death supervenes from the great exhaustion of the vital powers, generally arising from the diminished energy of the brain and nervous system, consequent upon the circulation of impure blood in the system at large. Under such circumstances the body presents before death a very cadaverous appearance, and the individual expires in faint and distant acts of breathing.

When the bowels are most affected, the symptoms are chiefly referable to the seat of the complaint, but vary according to the effects produced. In very severe low fevers there is frequently a liability to bleedings from the bowels, which often cuts off the patient very suddenly. In other cases, again, the symptoms are all indicative of inflammation or irritation, which, if not subdued, very rapidly exhaust all the vital powers, and thus end in death, from the various general and local morbid effects which are produced.

Experience and observation have made medical men familiar with the different symptoms and changes which take

place in the course of different fevers, and examinations after death have shewn the direct causes of the fatal change ; consequently they have been led to adopt a system of treatment, calculated on the one hand to assist Nature, and on the other to prevent morbid changes from taking place.

The rate of mortality in fever varies according to the prevailing types of the disease in different places. The average mortality of fever treated in hospitals is about 1 death in every 15 cases, but in private practice, and particularly amongst the poor in densely populated localities, the average will be considerably higher. According to Dr Cowan, in Glasgow, in 1837, when fever was unprecedentedly prevalent and fatal, the average mortality in that city was 1 in 10. In the two previous years, 1835-36, it was 1 in 15 and 1 in 12 respectively.* According to the Dundee Bills of Mortality for the four years, 1836-7-8-9, the average mortality in fever would be about 1 in every 11 1-3d cases, which is certainly a high proportion, but it is still a little lower than that of Glasgow ; for, according to Dr Cowan's report, in the three years above mentioned —namely, 1835-6-7, there were about 38,072 cases, of which 3433 died, or 1 in every 11.17. The general mortality from fever, including both hospital and private practice, and as occurring at all the different ages, may be reckoned at about 1 in every 13 cases.

According to the tables which Dr Cowan has given in his Vital Statistics, of the number of individuals affected with fever at different ages, " it appears that the period of life at which fever is most liable to occur is from the age of 20 to 25 years for the males, when the proportion is 21.23 per cent., and from the age of 15 to 20 for females, when the proportion is 23.83 per cent."

" The number of females at every age prior to 25 exceeds that of the males.

* Dr Cowan's Vital Statistics of Glasgow, p. 38.

"The number of females admitted under 20 years of age is 571.

"The number of males admitted under 20 years of age is 480.

"Excess of females under 20, 91 or 8.64 per cent.

"This fact must be kept in view, as it has an important bearing on the relative mortality of the sexes.

"The number of both sexes admitted from the age of 20 to that of 30 years is 1216, or 53.87 per cent.

"The number admitted under the age of 50 years is 1766, or 78.24 per cent.

"The admissions rapidly diminish after the age of 40. Of 2257 individuals affected with fever, 2075 were under 40 years of age, and only 182 above it." *

It is universally allowed by all medical men who have had sufficient opportunity of making observations upon the relative mortality from fever in both sexes, that the rate of mortality amongst males is much greater than amongst females. Dr Cowan, after giving tables illustrative of this important point, says—

"The first point that attracts our attention is the relative mortality of the two sexes, and certainly it is very remarkable. The total mortality of the males" (in the Glasgow Fever Hospital) "is 1 in every 6.121-163, while of the females it is only 1 in every 11.23-101.

"In the males the mortality is 14.83 per cent.

"In the females the mortality is 8.92 per cent.

"The deaths of the males within the first twenty-four hours (of admission) amount to 17.

"The deaths of the females within the first twenty-four hours (of admission) amount to 9.

"At almost every period of life embraced in the tables, the mortality of the males, from fever, exceeds that of the females.

"At the age of 15, the mortality is very nearly the same in both sexes.

* Dr Cowan's Vital Statistics of Glasgow, p. 20.

"At the age of 30, the mortality of the males is more than double that of the females.

"The rate of mortality is greatest in the females at the age of 45.

"The mortality of the males, under 20 years of age, 6.04 per cent.

"The mortality of the females, under 20 years of age, 4.90 per cent.

"The total mortality, under 30 years of age, 8.35 per cent.

"The total mortality, above 30 years of age, 24.84 per cent.

"From the Table of Mortality, without reference to sex, and which is a combination of the first two Tables, it appears that, after the age of 10, the mortality from fever slowly increases till the age of 35. From the mortality being 2.63 per cent. at 10 years of age, it has gradually risen to 14.92 at 35; at 40 it is 22.36; and at 50, 39.06.

"The mortality of the Scotch and Irish was precisely the same, while that of the English, if any inference can be drawn from such a small number, was considerably less."*

Dr Arrott, in his "Abstract of Medical Report" of the Dundee Royal Infirmary, during the year 1838-1839, says, "I have found the deaths from fever proportionally much greater among males than among females—among the old than among the young—among those who applied for admission at a late, than among those who applied at an early period of their illness—and very much greater among drunkards than among the temperate. These remarks are meant to apply to the typhus, or, as we term it, and I believe correctly, the contagious fever of this country." These observations of Dr Arrott quite agree with those above stated from Dr Cowan's reports.

To illustrate still farther the general mortality of fever,

* Dr Cowan's Vital Statistics of Glasgow, pp. 23, 24.

in relation to the relative mortality of both sexes, and also at different ages, we will present an abstract of Dr Kennedy's Medical Report, taken from Dr Johnson's Medical Review.*

Dr Kennedy, in his Report, "appends a Table of Monthly Returns of the Admissions, Discharges, and Deaths of Fever Patients in the several Hospitals, Dublin, distinguishing the sexes, from 1st January to 31st December 1837."

"This table exhibits a complete view of the rise, progress, decline, and intensity of the fever of 1837, in this city.

"It appears from it that, in that year, 11,085 fever patients were admitted into the Dublin Hospitals. Of these, 4,648 were admitted during April, May, June, and July, the period when the epidemic was at its height; and of the remaining 6,437, admitted in the eight other months, 1,030 were admitted in January when the influenza prevailed.

"The total number of deaths was 1,103, giving an average mortality of 1 in every 10 1-10th.

"The relative number of males and females attacked, as well as the relative mortality of the two sexes, as exhibited in this table, is very remarkable, and well worthy of attention. The number of males admitted to hospital was only 4,986, whereas of females there were 6,099. The mortality of the males was 1 in every $8\frac{1}{8}$, while of the females it was only 1 in every $12\frac{1}{2}$; or,

"In the males the mortality was $12\frac{1}{2}$ per cent.

"In the females, $8\frac{1}{2}$ per cent.

"The relative mortality of the different hospitals is a circumstance highly deserving attention, as well on account of the differences as of the agreements amongst them

* Medical Report of the House of Recovery and Fever Hospital, Cork Street, Dublin, for two years, from 1st January 1837 to 31st December 1838. By E. A. Kennedy, M.D., President of the College of Physicians, 1839.—*Medico-Chirurgical Review, January* 1840.

in this respect. Thus, while the mortality at the Hardwicke, Duns, and the Meath Hospital was so high as 1 death in every 7; in Steeven's and the House of Recovery it did not exceed 1 in every 12.

"There is no point in the history of fever respecting which we have more conflicting statements than this of the mortality in hospitals. It is usually supposed to depend upon a great variety of circumstances, over which the physician has no control—such as the extent of the accommodation in proportion to the number—the facility or difficulty of admission into hospital—the ages to which admission is restricted—the character of the prevailing epidemic—and the period of its duration at which the observations are made. It seems, however, probable, from the discrepancies as well as the coincidences in the rate of mortality in the Dublin Hospitals during the same epidemic, observed in the same periods of its progress, that this depends on fewer and more general causes than is commonly imagined. This view receives remarkable support, from a consideration of the rate of mortality in the tents of the House of Recovery, Cork Street, as exhibited in the table. In these the patients were placed in apparently the same circumstances, and exposed to the same influences, throughout the whole course of the epidemic; yet nothing can be more variable than the mortality. Thus, we find, in May, 1 death only in every 12; in June, 1 in every 7; while in August we have only 1 in every 19. That this did not depend upon any variation in the nature of the epidemic itself, appears in the highest degree probable, from a comparison of the rate of mortality in the tents and in the adjoining hospital. Thus, in June, when the deaths in the tents amounted to 1 in every 7, the mortality in the house was so small as 1 in every 15.5."

And Dr Kennedy adds:—

"From an examination of these tables, it appears that, in this epidemic, the greatest number of attacks occurred from the age of 10 to 15 years for the males, when the

proportion is about 18 per cent., and from the age of 15 to 20 for the females, when the proportion is nearly 16 per cent.

" The number of females at every age, previous to 70, exceeded the number of males.

" The number of females, under 20 years of age, is 1,588.

" And of males, 1,376.

" Excess of females under 20, 212 ; or a little more than seven per cent.

" In the Glasgow Fever Hospital, from October 1835 to November 1836, this excess was found to be above 8½ per cent. ; and, as Dr Cowan has observed, this fact should be kept in view, as it has an important bearing on the relative mortality of the sexes.

" The number of both sexes, from the age of 15 to that of 30 years, was 2,628, or 42½ per cent.

" The number under the age of 30 years, 4,517, or 73 per cent.

" After the age of 45 the numbers rapidly diminished. Of the 6,724 cases computed in this table, 5,962 were under 45 years of age, and only 762 above it, being about 88 per cent. for the former, and 11 per cent. for the latter.

" In viewing this table in reference to the *mortality* in fever, the first thing that strikes one, is the great difference in this respect between the sexes: thus, while the total mortality of the males is 1 in 9½, that of the females is only 1 in 15.

" At almost every period of life comprised in the table, the mortality of the males from fever exceeds that of the females. In the earliest period of life, up to 5 years, the difference in this respect is not striking. After this age it increases, until, at 20, the deaths amongst the males are 1 in every 16, while amongst the females they are only 1 in every 42. From 20 to 25 the numbers are again nearly equal; but from 25 to 40 the deaths are nearly twice as numerous amongst the males as the females, after which,

to 55, the difference becomes still greater—the proportion for the males being 1 in 3, for the females nearly 1 in 11. From this time to the 80th year the mortality is nearly the same in both.

"The rate of mortality is greatest, both in males and females, at 60.

"Looking to the total number of deaths at different ages, it would appear that the mortality of fever is considerable up to 5 years of age, from which to 15 it is remarkably small, after which it increases and goes on, almost steadily augmenting, up to 60."

*Causes of Sudden Death from Particular Diseases.*—In concluding the first part of this chapter, we will briefly take notice of those diseases which most commonly give rise to sudden death. These are affections of the lungs, of the brain and spinal marrow, of the heart, and of the stomach and bowels.

In different affections of the brain death very frequently occurs suddenly, from apoplexy either in its *sanguineous* or serous form. Some authors are inclined to think that the immediate cause of death in such cases is to be attributed more to the particular state of the lungs which is induced by the stroke, than to the direct paralysing effects which are produced upon the nervous system generally; and such is very likely to be the case: for, according to M. Denergie,* of forty cases of sudden death, there were only four which could be strictly attributed to actual *lesion* or disease of the brain; twelve in which the brain and lungs were conjointly affected; and twelve in which death could be ascribed strictly to *lesions* of the lungs themselves. So in twenty-eight cases of sudden death from diseases of the brain and lungs, there were four of the brain, twelve of the brain and lungs conjointly, and twelve of the lungs themselves, making in all 24 cases of the forty in which the lungs were affected. But before assenting to the con-

* Annales d'Hygiene Publique, July 1838.

clusion of M. Denergie, that, in the above-mentioned cases, the affection of the lungs was the chief cause of death, we would require to examine particularly into the nature of those affections of the brain, and of the lungs, as compared with each other. It has always been admitted that there may exist certain *lesions* or affections of the brain, and consequently of the nervous system generally, whose existence (owing to the nature both of the functions and structure of the parts) may escape being detected by the scalpel of the morbid anatomist; whilst, on the contrary, diseases of the lungs are easily detected, owing to their functional and vascular nature: consequently, in the greater proportion of those cases which M. Denergie has given as terminating from diseases of the lungs and brain conjointly, and even of those cases in which no disease or *lesion* was observed in the brain at all, the primary and unforeseen causes might rest and originate in the brain itself. In almost all cases of low typhus fever the symptoms are strictly indicative of some affection of the brain; but it is in the fewest of such cases after death that the scalpel shows any very obvious *lesions* of that organ, whilst those of the lungs and bowels are very generally observed. It has always been thought that affections of the heart are very common causes of sudden death; but this M. Denergie disputes too. In the forty cases which he examined, he only found three which could be ascribed to actual disease of that organ. But the organic action of the heart is so directly influenced by the nervous system generally, as is seen in the case of fainting from any sudden surprise or impression, that the actual suspension of its functions, through the influence of nervous impressions, may in many cases be the direct cause of death, without there being any very obvious disease or lesion of the heart itself. Indeed, the organic or vital actions, respectively, of the brain, lungs, and heart are so mutually dependent upon each other's functions, that we are inclined to think that, in the most of cases in which these

organs are conjointly affected, it must be in a great measure a matter of conjecture in ascribing the particular and direct cause of death. However, we quite agree with M. Denergie in his statements regarding the lungs being the organs which, in the great majority of cases of sudden death, show the most obvious marks of derangement and disease.

Bleeding or *hæmorrhage* is not an uncommon cause of death. Fatal cases of such most generally occur from the rupture of blood vessels in the stomach and bowels, in the course of protracted fevers, and other lingering diseases in which the vital tone of the system is much reduced. Sudden death also frequently occurs from hæmorrhage of the lungs. The direct cause of death in sanguineous apoplexy is thought to be the sudden effusion of blood into the substance of the brain. Rheumatism and gout often terminate very suddenly, it is supposed, from a *metastasis* or shifting of these affections to the heart, and to the stomach, respectively.

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## PART II.

### On the Chief Causes of Death in Children from Diseases.

*General Remarks on the Diseases of Children.*—According to the bills of mortality not less than one-third of the whole number of deaths occur in children under seven years of age; and so great is the mortality in infancy, or under two years, that at least one-fourth of the whole number occur in this period. This great mortality amongst children may appear rather striking at first; but when we take into consideration the numerous epidemic

and periodical diseases almost peculiar to infancy and early childhood, we will feel less surprised at such statements. And, again, considering the very delicate and susceptible condition of the body in early life, it is quite obvious that all impressions of disease, to which infants and very young children are liable, must operate more powerfully on their delicate frames, thus rendering all their complaints much more precarious and dangerous.

The great susceptibility of the nervous system in children renders them liable to very complicated affections; for irritation in any part of the system usually gives rise to much constitutional disturbance, hence the many complicated complaints which often accompany teething. The different symptoms and affections in children arising from irritation are too numerous to be described individually, so we will confine our observations to those diseases only which are the most fatal.

*Death from Water in the Head.*—Water in the head has been generally considered a fatal disease; but it must be allowed that cases often occur presenting all the symptoms, and which, nevertheless, recover. Such symptoms, however, usually arise from irritation or derangement of the stomach and bowels, and, consequently, cannot be considered as genuine or *idiopathic* cases of *hydrocephalus*. As all the symptoms of water in the head very often follow and accompany other complaints, it is often very difficult to say what may really be the nature of the case; but such cases may end in hydrocephalus, notwithstanding the seat of the irritation being very far distant from the head itself.

Water in the head attacks children of all ages, but it occurs oftenest during teething. There seems to be a particular predisposition to it in some family constitutions; for it often happens that almost whole families die of the disease. It generally makes its attack in a very insidious manner. The child may be running about in its usual way, only appearing at times rather dull, and occasionally

complaining a little of its head, which it may be inclined to lean on its mother's lap, or against any thing else. Such may be the case for a good many days. By and bye, however, he becomes more listless, looks dull, and altogether appears quite out of his usual way. The child then takes to bed—he is weak, irritable, and feverish—the bowels are for the most part costive, and there is generally vomiting and screaming, with manifestations of pain in the head. After these symptoms have continued for some days, signs of oppression of the brain supervene, as indicated by the paleness of the countenance, the suffusion of the eyes, the motionless and dilated pupils, with all the other symptoms of diminished nervous power. Such are the usual symptoms of *hydrocephalus*, or water in the head.

This disease seems to arise from certain causes influencing the brain in individuals predisposed to it. Scrofulous children are most commonly affected with it, though it often occurs in those who bear no marks of that disease. It seems to arise from the brain being altered or weakened, and from a subsequent determination taking place towards that organ. This peculiar condition of the brain renders it unable to perform its healthy functions; so the whole nervous system soon becomes affected, and the brain, being the real seat of the disease, of course suffers most. This altered state of the brain renders it no longer able to withstand the irritation, and to resist the determination of blood; so effusion of water or *serum* is the consequence. After death, the blood vessels of the brain are generally very much distended, and there is always an effusion of *water* into the *ventricles* or cavities of the brain.

*Death from Croup.*—*Croup* is one of the most dangerous and one of the most alarming diseases of children. It very often begins just like a common cold. The little patient may have a pretty quick cough, with rather a ringing, or it may be a rough, sound. When the cough is absent, the child appears pretty easy; but the moment it comes on again, there are marked signs of partial suffocation.

This may be the case, perhaps, for a day or two; but generally the fits of coughing gradually become more frequent, and, as the disease advances, the cough sounds as if through a brazen trumpet. The child usually froths a good deal at the mouth, the suffocation becomes more and more imminent, and every fit of coughing brings up a quantity of tough mucus. Sometimes, even until the very last, the child may be sitting up in bed in the intervals of the paroxysms; but suddenly a suffocative cough supervenes, and the little sufferer expires.

Croup is essentially an inflammatory disease in the windpipe and the large branches of the air-tubes in the lungs, and in protracted cases the inflammation often extends to their more minute ramifications. Along with the inflammation, there is a peculiar tendency in this disease to the formation of a tough *false* membrane in the inside of the windpipe, which forms the most prominent cause of the suffocation. So perfect is this membrane sometimes formed, that pieces are often expectorated bearing the exact shape of the tube.

After death, the windpipe and *bronchi* are found very much inflamed, their mucous membrane being very red, and covered with a tough glairy secretion, and often with the *false* membrane itself, of a yellowish colour, more or less firm, according to the violence of the disease. This stopping up of the windpipe and air-tubes is evidently the cause of death.

*Death from Catarrhal Fever.*—This is a very common complaint amongst children in the spring months, and, if not treated judiciously in the first stage, is very apt to prove fatal. It begins with a slight hard cough, smart fever, and flushed face. After two or three days, the child assumes a very sickly appearance, the breathing is greatly oppressed, with heaving of the chest, and incessant expansion of the nostrils. As the complaint advances, the child looks very pale and sunk—the breathing becomes more and more difficult, as is shown by the rapid motion of the

chest and nostrils—a good deal of frothy expectoration gurgles in the throat—and the child gradually sinks, and expires from exhaustion.

Catarrhal fever, or *bronchitis*, is an inflammation of the lining membrane of the *bronchi*, or air-tubes; but it differs from croup entirely, in there not being any secretion of a false membrane. The frothy expectoration arises from the resolution of the inflammation into a secretion of mucus. When the inflammation runs very high, and when the secretion is very abundant, the air-tubes become completely choaked with it, which gives rise to suffocative symptoms. Great exhaustion is thus induced by the general affection of the whole mucous membrane—the process of respiration is not properly performed—the blood is not purified in its passage through the lungs—the whole system is consequently changed, the bronchial secretion rapidly increases, and the patient dies from obstructed respiration.

After death, the lungs are found to be very much engorged. There is usually redness of the whole bronchial membrane, with copious secretion of mucus into the most of the bronchial tubes, which is sufficient to account for death.

*Death from Hooping-Cough.*—Hooping-cough is another disease of the bronchial tubes; but it differs from the two former in being complicated with a spasmodic affection, and in its prevailing *epidemically* amongst children at certain seasons of the year. It comes on like a common cold; but the cough soon assumes a distinct whoop, which is characteristic of the complaint. As the disease advances, the cough occurs in distinct fits, which consists of a long sonorous inspiration followed by a series of very rapid expirations. During the fit, the face is greatly distended and red, together with an intense appearance of suffocation and constriction; then follows a vomiting of large quantities of mucous secretion, and an expectoration, which is tough and transparent.

Hooping-cough is not generally a fatal disease; but when children do not make a good recovery, it often ends in bronchial consumption. In such cases, there is found after death inflammation of the mucous membrane lining the windpipe and bronchi; and if the disease has continued long, there may be even ulcerations in these parts: hence the origin of the profuse gross expectoration which accompanies the termination of such cases. The child dies gradually exhausted.

*Death from Scarlet Fever.*—Scarlet fever is often a very fatal disease amongst children. It is ushered in with pretty smart fever, soon followed by an eruption of the skin, with soreness in or about the throat. The rash first appears in patches, but it gradually becomes more diffused, and soon spreads pretty generally over the whole body. When the case is very complete, the rash is almost universally diffused, and of a florid red colour, a little rough and elevated, and in some instances very like the appearance of a boiled lobster. In such cases, the throat is generally more or less affected, being somewhat swelled, very red, and very painful. When the rash comes well out, the throat is a good deal relieved; but when it does not appear regularly, and does not stand out a proper length of time, the throat usually becomes very much affected, and these are the most dangerous cases. When the eruption is of a vivid colour, and stands well out, the case usually terminates favourably, even though the throat be pretty severely affected. Such is the common course of mild *scarletina;* but it is very different in that which is termed the malignant kind, for it generally proves fatal. The malignant scarlet fever commences very like the above, but it soon assumes a very serious aspect. The eruption is usually faint, and appears in patches; it assumes a dark livid colour, is rather tedious in coming out, and often goes partially in and comes out again. The pulse is small, the skin is a little hot and looks unhealthy, the eyes are dull, and the tongue is covered with a brown coating. Deep

and unhealthy ulcerations occur in the throat, the breath has a very bad fetor, and an acrid discharge issues from the nostrils. Before death takes place, the system seems very much depraved—dark spots appear on the skin, diarrhœa supervenes, and in very bad cases there are discharges of blood both from the mouth and bowels.

Death arises from the morbid state of the whole system, brought on by the extensive disease of the mucous membrane lining the throat and bowels.

*Death from Measles.*—Measles is another of the eruptive diseases which often proves fatal to children, but it is generally a mild disease. It comes on with a watering of the eyes, redness of the countenance, running of the nostrils, and sneezing. These symptoms having continued for two or three days, a small eruption makes its appearance, first about the breast and face, then over the rest of the body. The eruption consists of small red dots, which become extended, and form into circular patches. The rash begins to decline about the sixth day, and by the eighth it has generally disappeared.

Death always arises in measles from a determination taking place to some important part of the system. The lungs are the most common seat of inflammation in the course of the disease; and, when the complaint proves fatal, very different *post mortem* appearances may be presented. Indeed, the appearances after death depend entirely on the individual part or parts within the chest which may have been most affected; for there may be either inflammation of the substance of the lungs, of the *pleura*, or of the bronchi, all of which have different terminations.

*The Mortality from different Diseases Compared.*—It is a singular fact that diseases of the skin, along with all the particular affections of the *digestive organs*, and of the chest, which they frequently induce, prove, upon the whole, nearly as fatal as the whole *specific* diseases of the digestive organs taken together. But the diseases of the *respiratory organs* are more fatal than either. The whole

mortality from all the diseases of the skin and of the digestive organs, taken together, is as 4. per 1000 of the population; from diseases of the lungs, &c., it is as 5.5 per 1000; from diseases of the kidneys, &c., it is as .236 per 1000.

In the unhealthy districts of London, it appears that the mortality from epidemic diseases is higher than the mortality from diseases of the respiratory system. In the healthy districts, on the contrary, the mortality from the former is lower than the mortality from the latter class of diseases.

"*Annual Rate of Mortality per cent.*

| Districts. | From the Epidemic Class of Diseases. | From Diseases of the Respiratory Organs. | Absolute Mortality from all Cases. |
|---|---|---|---|
| 1–10 (unhealthy), | .99 | .82 | 3.32 |
| 11–20 . . | .70 | .77 | 2.84 |
| 21–30 (healthy), | .48 | .59 | 2.16"* |

The mortality of towns is frequently very much increased from epidemical diseases chiefly affecting children. Dr Johns stated, that in Manchester, in 1838, when hooping-cough, measles, small-pox, and scarlet fever were very prevalent, the deaths arising from these diseases increased from 10 per cent. of the whole number of deaths to 22½ per cent. Such occurrences account for the great mortality of early life, and likewise shew how much a great proportion of infants and children in any population increases the general rate of mortality.

Dr Cowan, toward the end of his valuable little work, the Vital Statistics of Glasgow, says—

"The other epidemics which have contributed to swell the lists of mortality during the last three years, 1835-6-7, have been small-pox, measles, scarlet fever, hooping-cough, and catarrh or influenza—the four first diseases affecting chiefly the infantile portion of the community, as will appear from the following tables:—

* Report of the Registrar General, 1839.

" *Table of the Deaths from Small-pox, Measles, Scarlet Fever, and Hooping-cough, in* 1835-6-7.

| | Small-Pox. | Measles. | Scarlet Fever. | Hooping-Cough. | |
|---|---|---|---|---|---|
| 1835, | 473 | 426 | 273 | 483 | |
| 1836, | 577 | 518 | 355 | 454 | |
| 1837, | 352 | 351 | 79 | 457 | |
| | 1402 | 1295 | 707 | 1394 | Of which there were |
| Under 5 years of age, | 1256 | 1187 | 440 | 1298 | |
| Above 5 years of age, | 146 | 108 | 267 | 96 | |

" The above diseases may be considered the epidemics of children, and it is very remarkable how large a proportion of the deaths from them are under five years of age. The deaths from small-pox in London, during the last year, were only 300, while in Glasgow they amounted to 352."

" *Table of the proportion which the Deaths from Small-pox, Measles, Scarlet Fever, Hooping-cough, and Fever, bear to the whole Deaths in* 1835-6-7.

| | 1835. One to Every | 1836. One to Every | 1837. One to Every |
|---|---|---|---|
| Small-pox, | 15.737 | 14.629 | 29.176 |
| Measles, | 15.253 | 16.295 | 29.342 |
| Scarlet Fever, | 23.802 | 23.777 | 130.000 |
| Hooping-cough, | 13.453 | 18.592 | 22.472 |
| Fever, | 15.571 | 10.036 | 4.711" |

The above tables present a frightful view of the state of public health in Glasgow, especially as affecting the early years of life. During the above periods, small-pox, measles, and hooping-cough, have been peculiarly fatal, apparently much more so than scarlet fever, which is just what would be expected considering the unhealthy state of that city for some years past. The three former diseases are more apt to take on a malignant type from unhealthful influences than the latter, because the respiratory

mucous surfaces are more peculiarly affected in them than in scarlet fever, the disposition of which is to affect the glandular and cellular tissues about the throat, generally originating in an acute morbid inflammation of these parts. About the east coast of Scotland, and in Edinburgh, we are inclined to think that scarlet fever and croup are much more fatal to the young than on the west coast and in Glasgow, which circumstance may be attributed to the greater prevalence of bitter east winds, which prevail during at least half the days of the year. During seven years practice the writer has only had six fatal cases of hooping-cough, two of which were in a very unhealthy family, and terminated fatally from bronchial consumption. He has had few deaths from measles, none from small-pox, (but the cases of the latter disease, though some of them very severe, have not been numerous—not above twelve in the above mentioned period), but he has had an immense proportion of deaths from scarlet fever and croup, two diseases which are generally of a very dangerous character in the county of Fife. So the great mortality in Manchester and Glasgow amongst the young, particularly from small-pox, measles, and hooping-cough, we are inclined to think, must arise from the general combination of unhealthful influences which exist in these two large manufacturing cities, and in all other densely populated districts.

*Mortality at Different Seasons.*—The fatality of all the different diseases depends very much both upon prevailing states of the atmosphere, and upon the season of the year. A warm close atmosphere is very unfavourable to all complaints accompanied with general weakness, and particularly to all those fevers which are characterized by great diminution of the vital powers. In such cases a close warm atmosphere favours an increased action in all the excretory functions, and consequently gives rise to a proportionate weakness of the whole system. A mild dry atmosphere, generally speaking, is favourable for the most of complaints, because it tends to keep up an equable or

healthy action of the whole system: all chest affections and bowel complaints in particular are benefited by a mild dry state of the atmosphere. Inflammations of the throat are generally most relieved by rather a moist state of the atmosphere, if not accompanied with cold winds; for a cold moist atmosphere is the most common cause of sore throats. East winds generally give rise to croup and quinsey in children; and during the time the wind continues in that quarter the cases are usually very severe, and often very fatal; but in the event of its shifting to the south or south-west, they always undergo a change more or less favourable. In long continued cold wet winds, inflammatory affections of the bowels and lungs are most fatal. Moist states of the atmosphere, if not accompanied with severe cold, are favourable to the most of acute inflammatory affections, and particularly to the most of eruptive fevers, but, when accompanied with severe cold, intense local inflammatory action is apt to take place, as is often observed in the inflammatory affections of the lungs and throat in cases of measles and scarlet fever; and, under such circumstances, many cases of continued or typhoid fever are apt to terminate fatally from some local inflammation, particularly of the bowels. All nervous affections, associated with general weakness, are benefited by a mild dry atmosphere and sunshine; but the reverse is the case in nervous affections characterized by excitement. All cases of high delirium are rendered worse by a dry and highly electrified atmosphere; all diseases again characterized by nervous depression are benefited by such states of the atmosphere. In winter, the most fatal diseases are continued fevers, and insidious cases of inflammation of the chest and bowels, often terminating in some species of dropsy. In spring, acute inflammatory affections prevail most, such as *pleurisy* and rheumatism, with the different inflammations of the throat. In this season, protracted diseases of different kinds often terminate fatally, particularly pulmonary con-

sumption. Summer and autumn are most fatal to individuals broken down from long continued bowel complaints. A great many old people usually die during these seasons. "In 1838, the mortality in London was 42 per cent. greater in the three cold months, January, February, and March, than in July, August, and September; and this is probably the average difference. Two hundred years ago the case was reversed: the heaviest mortality then was in the warm months, and the lightest in the cold ones," which might arise from the habits of the people being less cleanly then than now. Such is a very imperfect enumeration of a few particulars regarding the mortality at different seasons and under particular circumstances. In order to give the reader some idea of the average proportion of deaths from all the different diseases, we will present a short statement of the general mortality of public hospitals.

*Mortality of Hospitals.*—The mortality of public hospitals varies considerably, according to the medical disposition of the establishment, the prevailing diseases, and the types they generally assume. Dr Hawkins has been at great pains in collecting all the information he could on this subject; but, as his details could neither be appreciated nor correctly estimated by the popular reader, we will only give an abstract of the average mortality of a few of the hospitals in this country and on the Continent.

The proportional mortality in the different hospitals in London, appears to be about 1 death in every 10 cases; but in St Thomas' Hospital, from 1764 to 1813, nearly 50 years, the average was only 1 in every 15 cases. The average of the hospitals in Paris is 1 in every 8 cases; but in the Hotel Dieu the mortality is one-fifth of all admitted. The mortality of the Edinburgh Royal Infirmary, on an average of the 10 years previous to 1818, was 1 in 16 of all admitted; but, according to Dr Alison, the mortality of this hospital has been gradually on the increase for some years past, and that last year it was so high as

1 in 8. In the Glasgow Royal Infirmary it is about 1 in 12; but, in that institution, nearly one-half of the cases are severe typhus fever, which must greatly increase the proportional mortality. In the Dublin Hospitals, the deaths are about 1 in 12 or 13. In all the provincial hospitals of this country the deaths are about 1 in every 15 admitted.

In the surgical wards of public hospitals the rate of mortality varies much more than in the medical ones, the reason of which is very obvious. In the course of some years there are fewer fatal accidents than in others, and as such generally constitute the chief number of fatal cases in the most of hospitals, in large towns the general rate of mortality varies accordingly. By reference to the surgical reports of some of our principal infirmaries, it is found that in some years the mortality is as high as 1 in 14 of all admitted, whilst in other years it is not more than 1 in 25 or 30. The rate of mortality is often considerably influenced by the occurrence of *erysipelas* in the surgical wards, which often spreads over many of the cases, and thus renders them very precarious, and very frequently brings about a fatal termination.

## CHAPTER III.

On the Endemic and Epidemic Causes of Disease, and on the Mortality from some of the principal Epidemics which have occurred at different periods.

*Endemic and Epidemic Diseases* have been usually ascribed to specific causes in certain localities, and to prevailing states of the atmosphere. Ague, or intermittent fever, from its prevalence in marshy districts, has been always attributed to the noxious effluvia arising in such places from the decomposition of the animal and vegetable matter so abundantly contained in stagnant pools or marshes. This deleterious agent has been called *marsh miasmata* and *malaria.*

The existence of such a poison in the atmosphere in the vicinity of marshes has been lately proved, it is thought, by M. Bausingalt, who read a paper regarding his experiments on the subject before the Academy of Sciences. His experiments proved, that, when the dew arising in marshy situations is condensed in a watch-glass, there is always found, by chemical test, *a trace of carbonaceous matter* in the glass upon which the dew has been deposited, whilst none of that carbonaceous deposit could be detected in the one upon which no dew was deposited. Dr B. always found sulphuric acid very rapidly blackened in the vicinity of stagnant pools, which he attributed to the presence of this carbonaceous matter in the atmosphere.

In general, the endemic causes of disease, in particular localities, may be referred to the nature of the soil and climate. A country abounding in marshes and stagnant pools is never healthy; and a locality in which the soil is of a deep alluvial nature, and much loaded with decayed

animal and vegetable matter, is seldom free of some endemic disease.

In temperate climates, marshy and low-lying lands, which have been partially covered with water, are productive of the various types of intermittent fever or ague. In hot countries, again, dysentery, chronic diarrhœa, Indian cholera, inflammation of the liver, bilious and remittent fevers, are the most frequent consequences of marshy exhalations. All these different diseases or affections, however, are much modified by the other prevailing influences—namely, the state of the atmosphere, the quantity of decayed animal and vegetable matter abounding in the soil, and very much by the original constitution and habits of living peculiar to different people.

The continued fevers of towns and other localities seem to arise likewise from unhealthy or malarious exhalations. In country places, fever very often arises in localities adjoining dirty stagnant water, issuing from manure depots or other sources of impure drainage. In large towns, where there is a want of proper sewers to carry off the various impurities, and a neglect of domestic cleanliness, fever generally prevails, and spreads in proportion to the intensity of those causes which favour its production.

When fever does prevail to a great extent in any district, its origin may be always attributed to general want of cleanliness and ventilation, and its continuance, or spreading, to the increase of the morbid poison kept up both by its first causes and the consecutive influence of the fever itself.

Typhus fever seems to be generated chiefly by those influences which tend to lower the vital tone of the system. Long continued exercise or labour, accompanied with insufficient food and clothing—mental anxiety—undue exposure to cold and wet—poverty—dirty habits, both in respect to personal and domestic duties—unwholesome food—and intemperance, are the chief proximate

causes of the severe typhus which often prevails to such an alarming extent in our principal towns.

The morbid poison, or malaria, which produces typhus fever, seems to be also produced, and concentrated, by the fever when once established; consequently we are inclined to consider typhus an infectious disease—a disease which produces exhalations capable of affecting others, when sufficiently long exposed to their influence.

*Ague* was very prevalent throughout a great part of England in past ages, but now it is, comparatively speaking, not of very frequent occurrence. The drainage of marshes has always been attended with the happiest results in ultimately doing away with the different kinds of fevers; but in many places, where marshes and stagnant pools have been rapidly drained, very malignant fevers of the typhoid kind followed, from the sudden exposure of a soil, completely saturated with animal and vegetable matter in a complete state of decomposition, to the rays of the sun.

*Malaria—Its Mode of Operation in producing Fever.*—Very different opinions have been given as to the way in which malaria operates in producing fever. All morbid poisons exert at first a most depressing influence over the whole system. Ague is ushered in by cold shiverings and great inward oppression; typhus by all the symptoms of partially suspended organic action; and severe typhus, or malignant fever, is marked by all the symptoms of contamination of the fluids, with a very vitiated state of all the secretions. But the different species of malaria produce peculiar effects, according to their specific influence on the nervous system—their depressing influence or impressions being always in proportion to their strength or virulence.

In some districts malaria produces only remittent, mild typhoid, or *gastro*-bilious fevers. But where the poison is stronger and more concentrated, intermittent, low typhus, and other forms of malignant fever will prevail, just

according to the specific influence of the poison, and the constitutions and predispositions of the people affected.

The malaria, which produces ague, seems to act chiefly on the cutaneous and pulmonary organism; hence the great internal congestion—the external palour and shrinking—the severe shivering—and the suspirous breathing—all from the affection of the respiratory and the cutaneous organic nerves. The malaria, or poison, again, which produces typhus, seems to operate chiefly on the organic nerves of the abdominal viscera; hence the universal prostration, the vitiated secretions, and the internal morbid accumulations which always accompany typhus.

Endemic influences are, therefore, productive of very severe diseases; indeed fevers arising from such causes may be considered the greatest scourges of the human race. The bills of mortality furnish us with striking proofs of the great numbers which die annually in almost every civilized country, and in every town and city, from the ravages of fever in all its different forms.

In former times typhus fever was less known as an endemic disease than it is at present, which might be the case from there having been less crowding together of numerous individuals into small apartments; for such, accompanied with uncleanly habits on the part of the people themselves, seems to be the chief cause of the continued fevers which prevail so extensively in the most of the principal towns in Scotland and Ireland.

Ague, as we have just already mentioned, was a very common disease at one time throughout the greater part of England, and in all marshy districts in many countries; but since agricultural improvements became so general, marshes have been much dried up from the effectual system of draining which has been so generally adopted. So ague, in all civilized countries, has greatly disappeared; indeed, in the greater part of England and Scotland, now it is scarcely known; and such is also the case on most of

the continent of Europe. In the uncultivated intertropical countries of a marshy nature, and consequently having a moist atmosphere, it still prevails very fatally, as in the complicated bilious or yellow fever. Although we cannot present any interesting details regarding ague, we will give a short outline of the nature of the disease.

*Intermittent fever*, or ague, has always been considered to arise from *marsh miasmata*, or the effluvia which arises from marshes or stagnant water. As all marshes are completely saturated with vegetable and animal matter, in a state of decomposition, there must always be an emanation of noxious particles from such places into the atmosphere. These particles have been called *marsh miasmata* or *malaria*, and are said to be the cause of ague. It is in the vicinity of marshes that the disease generally prevails; and when it does appear in other districts, it is usually amongst those who either have had ague before, or have resided at some period of their lives where it prevailed as an endemic disease. However, cases similar to real ague are sometimes met with which cannot be directly traced to *marsh miasmata*.

Ague has three well marked stages—the cold, the hot, and the sweating. The cold stage commences with general languor, yawning, and stretching, with a great sense of debility. The face and extremities become pale, the features are shrunk, and the whole body appears constricted as if from intense cold. The sensation of cold becomes extreme, and universal rigors or shiverings come on, accompanied with pains in the back, loins, and extremities, sickness, and vomiting of bilious matter. The breathing is difficult and small, the pulse is frequent and weak, and there is generally drowsiness, and sometimes stupor. These symptoms having continued for a short time, the second stage commences with considerable heat over the whole body, accompanied with great redness of the face and skin, thirst, throbbing pain in the head, and restless-

ness, with a hard, quick, and full pulse. In very severe cases sometimes delirium supervenes in this stage.

These symptoms soon give way to the third stage, which is ushered in by a gentle sweat appearing about the forehead, which soon extends over the whole body. The continuance of the sweat reduces the heat, the thirst and other feverish symptoms gradually abate, and all the functions of the body are soon restored to their natural state. Such is the course of a regular paroxysm of ague.

These fits or paroxysms of ague may come on every day, every third day, or every fourth day; and the case is called a *quotidian*, a *tertian*, or a *quartan* accordingly. The disease sometimes lasts for a considerable number of weeks, and renders the patient very weak.

There is no other disease in which the efforts of Nature are so obvious as in the paroxysm of ague. The attack is cured for the time with the end of the paroxysm, but its recurrence is too certain at the regular period, so long as the patient remains under the influence of the exciting causes; and, even after a removal, it is often very difficult to cure. Ague cannot be considered a very fatal disease, but it often engenders bad health, in consequence of its bad effects upon different parts of the system. The morbid effects of ague are generally of a congestive kind, as manifested in engorgement of the internal organs, particularly of the liver and spleen. The latter organ, from frequent attacks of ague, often becomes very much enlarged, and ultimately gives rise to very bad general health, accompanied with great emaciation of the whole system.

*Typhus Fever* has now become an endemic disease in the most of civilized and densely populated communities. The typhus which generally prevails more or less throughout all the seasons of the year in Great Britain and Ireland, in America, in France, and in most of the other countries on the continent of Europe, is allowed to be the same

disease throughout them all, and seems to be produced also by similar causes. Formerly the fevers which generally prevailed throughout these different countries were chiefly of the intermittent and remittent character, arising from marshy exhalations; but we have now in their stead others far more fatal and malignant, viz. all the different kinds of *typhus*—a fever which exhibits many different morbid symptoms, and types, and which is now one of our greatest scourges. The concentration of great numbers of human beings together, accompanied with poverty, and a general want of cleanliness and ventilation, may be considered as the most powerful influence or cause in engendering fever; but of course this general cause will, in different places, be more or less favourable to its development, according to the prevalence of all the other collateral causes which we have mentioned as arising from the moral and domestic condition of the people. In all confined and crowded localities there must necessarily arise a great deal of noxious effluvium, which, being inhaled in every breath, alternately gives rise to that depressed state of the body which favours or actually produces the different types of typhus fever. It does not appear that typhus, like some of the epidemics which appear at certain seasons, can be attributed to particular states of the atmosphere, excepting as referable to the local and other causes which we have mentioned; for, as it is always more or less prevalent in certain localities remarkable for their unwholesomeness, there is every reason for thinking that the disease has its origin in such causes alone. In Paris, London, Manchester, Dublin, Edinburgh, Glasgow, Dundee, and all other crowded cities, the disease is constantly prevailing more or less; but, as we will afterwards observe, there are some years in which it is much more prevalent and fatal than in others: and such is the case also in rural districts and villages. The disease generally prevails most, in all localities, during the winter months, and particularly during a long con-

tinuance of damp cold weather. In the autumn the fever is often accompanied with dysentery; in winter it appears more as a general affection, with prostration of the whole vital powers, often ending fatally from some affection of the brain; in spring it is generally more inflammatory, accompanied with inflammatory affections of the chest; and in summer the cases are generally of a mixed nature, participating more or less of different types. Perhaps this is more the case in the country than in towns.

According to Dr Gerhard of Philadelphia, there have been some very severe epidemics of fever in America resembling very much the "British typhus." It appears that the epidemic which occurred in Philadelphia in the spring and summer of 1836, was produced and kept up by a combination of causes similar in every respect to those which favour the propagation of fever in this country. It is stated that "the patients were taken with the fever in various parts of the city and neighbouring districts, but by much the greatest number came from that part of the town which may be termed the St Giles, or the Faubourg Saint Marcel, of Philadelphia. The filthiest and most crowded alleys offered the greatest proportion of patients." "The first patients were almost exclusively from the poorest and most intemperate class of people, chiefly day labourers. Such was the case with the most of the blacks, especially the men, who were almost without exception in the habit of drinking freely of ardent spirits. The women were without fixed occupations, or were servants out of place. As the disease extended to the different parts of the city, people of various occupations were affected." * * * "According to the general rule, it attacked those who were sunk in poverty and intemperance, and huddled together in confined apartments."*

Such statements are quite in accordance with what is

* See London Medical and Surgical Journal, 22d July 1837.

known of typhus, both in this country and on the Continent. Dr Cowan, in his able Statistical Report of Typhus Fever, as it has prevailed in Glasgow, has brought forward many important facts concerning the general causes by which the disease is very much influenced. He says—"Up to November 1836, the period at which the commercial embarrassments were felt, the mortality from fever had not been very rapidly increasing. In November it was just about double what it had been in January preceding, the number of deaths being 45 in January, and 89 in November.

"The moment, however, the effects of the stagnation in trade extended to the working classes, the mortality increased with fearful rapidity, aided, no doubt, by the season of the year, the high price of grain, and the scarcity or high price of fuel. The deaths from fever in the four months preceding 1st December 1836, were 316; for the four months following, 696."*

*Mortality from Fever in different places.*—Dr Alison says—"That for many years past contagious fever has never been absent from Edinburgh, and there have been three great epidemics of that disease in the last twenty-two years, beginning in 1817, 1826, and 1836, (the last of which has now nearly subsided), each lasting nearly three years, and each of the two last affecting, I believe, nearly ten thousand persons. The number of fever patients admitted into the Infirmary and Auxiliary Fever Hospital, from November 1817 to November 1820, was 3090; from November 1826 to November 1829, it was 4318; and from October 1836 to October 1839, it was 4850." Dr Alison thinks "the number admitted into the Infirmary, during any of these epidemics, (not) to have been more than the one-half of the whole," and he farther states that the mortality in the last epidemic "amounted in 1830 to no less than one in six of all the fever patients

* Vital Statistics of Glasgow, p. 39.

admitted into the Infirmary."* So according to these statements there must have been at least 25,000 individuals affected with fever during the above mentioned periods; and taking the average mortality at about 1 in 12, there must have been at least 2000 deaths.

According to Dr Cowan, the mortality from fever in Glasgow has of late years been very great. It appears that for a great many years previous to 1815, there were not above 130 fever patients admitted annually into the Infirmary, but in the years 1817, 1818, and 1819 the average number was 905. In some subsequent years, during a stagnation in trade, namely, in 1825–26–27 and 1828, the number amounted to 1173, and since 1835, during the last long continued dulness in trade, the number has increased to the almost incredible amount of 3270. In 1837 there were no fewer than 5387 cases. During the last three years there have been in Glasgow 40,000 cases of fever! The Mortality Bills give 3835 deaths, 2180 of which occurred in the year 1827. From these reports, then, the rate of mortality in Glasgow, in fever, has been about 1 death in every 10 cases; and in 1827 the number of deaths from fever was fully one-fifth of the whole mortality.† It is estimated that there were at least 10,000 cases of typhus fever in Dundee in the years 1835–7–8 and 1839—there were 880 deaths. During these four years the whole mortality was 7160, so the deaths from fever alone constituted about one-eighth of the whole.‡

Although fever has been so generally prevalent and fatal throughout the large towns in Scotland (indeed, we may say, throughout the most of the country, for, according to the private reports of many country practitioners,

* On the Management of the Poor in Scotland, p. 8.

† Cowan's Vital Statistics; and Glasgow Mortality Bill for 1837, by Henry Paul.

‡ Dundee Bills of Mortality; and Report of Dundee Infirmary.

it prevailed very much in a great majority of our rural parishes), it does not appear to have been unusually prevalent in England, excepting in 1837; and, according to the First Annual Report of the Registrar General, the deaths in that year did not amount to more than one-sixteenth of the whole mortality. But it is stated in the Report that there were other cases, such as the remittent fever, inserted into the returns, which would, of course, swell the number of cases.

London has always been remarkably free from fever. According to Dr Bateman, in the ten years preceding 1817, there were only 600 cases of fever admitted into the London Fever Hospital. But of late, and especially during the year 1835, it has prevailed much more in different parts of the metropolis. According to one of the Reports of the Commissioners, in twenty of the Metropolitan Unions there were, in the year ending with March 1838, 12,700 cases of different types of typhus fever, in a population of 850,000; but it will be readily observed that even this number is not much above 1 in 61 of the population; whereas, in Dundee, in the years 1836–7–8 and 1839, the proportion might be reckoned at nearly 1 in 25. In 1827, in Glasgow, the proportion was 1 in 10, and, according to Dr Alison, in Edinburgh, in 1828, the proportion was about 1 in 30. But fever has been more prevalent in some of the Metropolitan Unions about Whitechapel. In a population of 165,928, in the year above-mentioned, the number of cases was 4676, which still only amounts to 1 in 35, not even so great a proportion as that of Edinburgh.

According to the statements of Dr Alison and Dr Cowan, the number of fever cases in the most of the large towns in England has been very small indeed compared with those of Scotland. We will give the statements in Dr Alison's own words:—

"The number of fevers annually treated in the Manchester Fever Hospital, for seven years ending 1836, was

497, hardly one-fourth of those treated in Glasgow in the same years, although the population sending patients there is nearly equal, and comprises many Irish. In 1836 and 1837 the numbers treated in hospitals in Glasgow were 8512, and in Manchester 1391. The number of hospital patients in fever at Leeds, a manufacturing town with 123,000 inhabitants, was 274 in the year, on an average of seven years before 1836, when the average at Glasgow was 1842. In Newcastle and Gateshead, the population of which is nearly 58,000, the number of fever patients taken into the institution appropriated to them, was only 8 in the year for some years before 1817, and only 39 in the year for seven years preceding 1836.* In Carlisle and its neighbourhood, a population of above 32,000 yielded 63 fever patients in the year to the house of recovery, on an average of seventeeen years before 1838, but in that year there was an epidemic affecting about 600 persons, of whom 265 came into the hospital. In some other English towns, particularly those which are not manufacturing (from which I have been favoured with statements), the exemption from fever for many years together has been still more complete. In Oxford, it is stated that a population of 16,000 does not afford to the Infirmary 5 fever patients in the year, and very few to the workhouse. In Bath, where the population is 55,000, it is merely said that 'few cases of fever occur either at the hospital or workhouse.' In Birmingham, where the population was 118,000 in 1831, and is thought now to be nearly 150,000, the number of cases by fever, including agues, treated in hospital, in seven years ending 1839, was only 485, averaging 69 in the year. In Sunderland, where the population is nearly 50,000, only 53 cases of fever were taken into hospital in the three years, 1836–37–38, *i.e.*, 17 a-year. This exemption, in the case of these towns, is certainly of many years standing.

* Cowan's Vital Statistics, p. 11.

"As a contrast, let us look for a moment at the ravages of fever in some of the Irish towns, as in Dublin, where the number of fever cases admitted into one hospital (in Cork Street) was 24,000 in ten years preceding 1817, and the whole numbers admitted into the different hospitals, in 21 months of 1817–18, was 39,000; or in Cork, where 'one-seventh of the population *passed through the different fever hospitals* of the city in the two years 1817–18;' or in Limerick, where it was estimated, and 'I believe with good reason, that one-fourth of the inhabitants sickened with the fever' in the same year; or in Waterford, 'where the sufferers from fever in those years cannot be reckoned at less than one-ninth of the whole population, while in the part of the city named Carrigeen, inhabited by the poorest and most miserable classes, there are good grounds for believing, that at least nineteen out of twenty persons suffered from the fever; and in Murphy's Lane, containing sixty houses, every inhabitant had an attack within two months;' or in Strabane, where 'it appears, from very accurate returns, that nearly one-fourth of the inhabitants were affected with the disease, of whom somewhat more than the average died;' and let us remember the observation everywhere made, that 'the poor were uniformly the greatest sufferers, and fever seemed to rage among them in proportion to the sufferings they had endured;' that 'the disease was most destructive in those parts of the country where the poor had least intercourse with the rich;' and that in several districts, even in those times, where 'great exertions were made to relieve the poor, and a large sum of money expended in providing the necessaries of life, there the epidemics never raged to any great extent.'"*

The above extracts will give the reader a very good

* Barker and Cheyne, vol. ii., p.p. 16, 26, 40, 122, 166. On the Management of the Poor in Scotland, by William Pultney Alison, M.D., F.R.S.E., 1840, p.p. 12, 13, 14, 15, 16, and 17.

idea of the immense numbers of human beings who are cut off annually by typhus fever. We will now consider some of the most fatal epidemics which have from time to time proved very destructive to the human race.

Diseases affecting great numbers at once, and which are not common throughout every period of the year, are called *epidemics*, meaning a disease *among the people.* Epidemics are always very alarming in whatever situations or amongst whatever class of people they appear. They may be divided into two great classes, the common or regular, and the uncommon or irregular.

The common class of epidemics are sometimes pretty regular in their appearance at certain seasons of the year. In *spring* the different inflammatory affections of the chest—inflammatory fevers, catarrhs, angina, rheumatism, and ague—are usually very common amongst adults; and croup, *bronchitis*, scarlet fever, and measles, often prevail amongst children. In *summer*, along with the continuance of the above diseases, the various continued fevers, chronic stomach and bowel complaints, erysipelas, *vesicular* and *pustular* eruptive diseases, as chicken-pox, and small-pox, generally prevail. In *autumn*, *endemic* cholera, dysentery, remittent fevers, sore throats, abscesses, and glandular obstructions of the bowels and other parts, are very common. In *winter* we have diseases approximating to those of spring, but always of a more serious nature; these are, low typhoid fevers, accompanied with inflammation of the brain, lungs, and bowels, severe rheumatic fevers, with affections of the heart, and very frequently the termination of acute and chronic diseases in the different kinds of dropsy.

Although these diseases generally occur in the above order, their appearance depends very much on the prevailing states of the atmosphere. High and cold winds occasion inflammatory affections of the chest, and rheumatic fevers; arid hot winds occasion inflammatory, bilious, and remittent fevers, inflammations of the eyes, and *en-*

*demic* cholera; sultry and humid states of the atmosphere generally induce typhus, accompanied with inflammation of the liver, stomach, and bowels, with dysenteric symptoms; continued droughts generally bring on sore throats of the inflammatory kind, pulmonary complaints, and exanthematous fevers, as measles and the different kinds of rash fevers.

All the above diseases, from their appearing pretty regularly throughout the year, have been called epidemics. But from their being common or almost regular in their appearance, they seldom excite any general panic. Strictly speaking, they are *endemic* diseases, or diseases of *the* country, but only they appear epidemically at certain seasons. As the most of the above-mentioned diseases have come under our notice in the two preceding chapters, we will now proceed to consider some of the epidemics which make their appearance but seldom, and which have been very destructive to human life.

The greatest scourges which the human race ever came under in epidemics were—*the Black Death, the Plague, and the Cholera Morbus.*

*The Black Death.*—An account of the awful ravages which the Black Death made in the fourteenth century, has been lately published in the German, by Dr Hecker, which interesting work has been translated into English by Dr Babington.* It appears that this terrible pestilence first broke out in China, then in the western part of Asia, about the year 1333. It then visited Constantinople, and depopulated the most of the country "from the north of the Black Sea." In 1347 it appeared in Cyprus, Sicily, Marseilles, and Italy. By 1349 it had spread over the most of Europe, and had extended to London.

The Black Death seems to have been a malignant fever, characterised by the appearance of black spots, swelling of the glands, and inflammatory boils of a very malignant

* The Black Death in the Fourteenth Century, 1833.

kind. The first appearance of the pestilence in China was preceded by many alarming phenomena. After a parching drought, accompanied with famine, there were such violent torrents of rain at Kingsai, that about 400,000 people perished in the floods. In the succeeding year the neighbourhood of Canton was visited by a similar inundation, whilst in Tche, after an unexampled drought, a plague arose which is said to have carried off 5,000,000 of people. About the same period violent thunder storms and other phenomena were observed in the north of France. According to the Chinese annals, 4,000,000 of people perished by famine in 1337. Over a great part of Europe and Asia about that time, there were numerous terrestial and atmospheric phenomena of simultaneous occurrence, such as protracted droughts, inundations, earthquakes, and volcanic eruptions—all accompanied to a greater or less extent with famine and pestilence.

When the *plague* broke out in the island of Cyprus, the air had such a poisonous odour, that many fell down and expired under the most dreadful agonies. "German accounts say, that a thick stinking mist advanced from the East, and spread itself over Italy; and then followed the earthquakes, famines, &c., to which we have already alluded, and of which almost every European nation had its share." Not only men but animals fell sick. Boccacio himself saw two hogs on the rags of a person who had died of the plague; after staggering about for a short time they fell down dead, as if they had taken poison. In other places, multitudes of dogs, cats, fowls, and other animals, fell victims to the contagion.

This plague was called in Germany the Black Death, in Italy the Great Mortality. The diseased was marked by the most malignant feverish symptoms. Black spots and boils appeared over the body; and there were "great imposthumes of the thighs and arms of those affected, which, when opened, afforded relief by the discharge of an offensive matter. The patients became stupified, and fell

into a deep sleep, losing also their speech from palsy of the tongue. Others remained sleepless and without rest. The *fauces* (throat and tongue) were black, and as if suffused with blood. No beverage could assuage their burning thirst, so that their sufferings continued without alleviation until terminated by death, which many in their despair accelerated with their own hands. Contagion was evident, for attendants caught the disease of their own relations and friends, and many houses were bereft even of their last inhabitant. Still deeper sufferings, however, were connected with this pestilence, such as has not been felt at other times. The organs of respiration were seized with a putrid inflammation, a violent pain in the chest attacked the patient, blood was expectorated, and the breath diffused a pestiferous odour."

But this grievous pestilence occurred in an age when enormous notions and barbarous practices added many other calamities. The Jews on different parts of the Continent were suspected of poisoning the wells! "A regular diet was held at Benfeld in Alsace, where the bishops, lords, and barons consulted how they should proceed with the Jews; and when the deputies of Strasburg spoke in favour of the persecuted, as nothing criminal was substantiated against them, a great outcry was raised, and it was vehemently asked, why, if so, they had covered their wells and removed their buckets? A sanguinary decree was resolved upon, of which the populace, who obeyed the call of the nobles and superior clergy, became but the too willing executioners. Wherever the Jews were not burned, they were at least banished; and so being compelled to wander about, they fell into the hands of the country people, who, without humanity and regardless of all laws, persecuted them with fire and sword. At Spires, the Jews, driven to despair, assembled in their own houses, which they set on fire, and thus consumed themselves with their families. At Strasburg, two thousand Jews were burned alive in their own burial-ground, where a large scaffold had been erected—a

few who promised to embrace Christianity were spared, and their children taken from the pile. The youth and beauty of several females also excited commiseration, and they were snatched from death against their will. Many, however, who forcibly made their escape from the flames, were murdered in the streets."*

Such were the additional horrors from ignorance, superstition, and bigotry. But we need not be very much surprised at these occurrences in the middle of the fourteenth century, when we reflect on what happened in 1832, both in this country and on the Continent, when cholera was raging. In Great Britain, the medical men were accused of poisoning the wells and of administering medicines to produce cholera; and churches and other places of public meeting were let to the ignorant declaimers of such monstrous notions.

" It is difficult to form an accurate estimate of the mortality. Cairo lost *daily*, when the plague was at its height, from 10,000 to 15,000; in China, more than 13,000,000 are said to have perished; in Aleppo, 500 died daily; 22,000 people, and most of the animals, were carried off in Gaza; and it was reported to Pope Clement at Avignon that throughout the East, probably with the exception of China, 23,840,000 persons had fallen victims. The following is supposed to be a probable statement of the mortality in many of the greater European cities:—

| | |
|---|---|
| "In Florence, there died of the black plague, . | 60,000 |
| In Venice, . . | 100,000 |
| In Marseilles, in one month, . . | 16,000 |
| In Sienna, . . | 70,000 |
| In Paris, . . . | 50,000 |
| In St Denys, . . | 14,000 |
| In Avignon, . . | 60,000 |
| In Strasburg, . | 16,000 |
| In Lubec, . . | 9,000 |
| In Basle, . . | 14,000 |
| In Erfurt, at least | 16,000 |
| In Weimar, . | 5,000 |
| In Limburg, . | 2,500 |
| In London, at least, | 100,000 |
| In Norwich, . | 51,000 |
| To which we may add Franciscan Friars in Germany, . | 124,434 |
| Minorites in Italy, | 30,000 |
| Total, . . | 737,934"† |

* Opus Cit. † Opus Cit. Johnson's Med. Review July 1833.

Such is a statement of the principal facts of this awful plague, taken from Dr Babington's interesting work. In glancing over the above particulars, we observe that the black death was most fatal in the Eastern countries. The Chinese Empire lost *thirteen millions*—half the population of Great Britain and Ireland! and throughout the East the almost incredible number *twenty-three millions eight hundred and forty thousand* died! In Europe, the reported number is comparatively small, being only about *eight hundred thousand!*

*The Plague.*—The disease, well known by the name of the plague, is very common in Turkey, especially about the Levant, and also in Egypt. It has all the symptoms of low typhoid fever, accompanied with very great prostration of all the vital powers. The plague is characterized by dark spots on the skin, carbuncles, hæmorrhages, and colliquative diarrhœa, and it has always been considered a very infectious disease.

M. Clot Bey, surgeon to the Pacha of Egypt, is of decided opinion that the plague is not a contagious disease, but he says that almost all the medical men of Cairo are decidedly contagionists. In his account of the plague, which cut off 20,000 persons in 1834-35, he describes all the medical men as having acted under the greatest dread of being infected, most of them having been very careful in not touching the patients, nor in remaining long with them. From all that is known of the propagation of the plague, we would consider it *infectious*—a disease which produces a poison capable of affecting those sufficiently exposed to its influence, as in typhus; but it does not appear to be communicable from one person to another simply from touch.

However, it is well known that, when the plague appears in any place, it very quickly spreads, and that always with a rapidity proportionate to the circumstances which favour the spreading of all epidemic diseases, namely, confinement, poverty, and want of cleanliness.

The plague, strictly speaking, is an endemic disease; for in many parts of Turkey and Egypt it is seldom altogether away. Certain states of the atmosphere undoubtedly favour its occurrence and propagation; but it seems to originate always in those districts in which it is considered endemic. When the disease is once established in any place, the infectious particles or molecules may be carried in the atmosphere to other places, and thus give rise to its propagation amongst all those most predisposed to its influence.

The plague, as we said before, is attended with great prostration of the vital powers from the very commencement. The individual soon becomes rather incoherent, bordering on low muttering delirium—the pulse gets weak and irregular—the countenance looks anxious and dejected—and altogether the patient presents a very deathlike appearance. Dark spots, *buboes*, and carbuncles, appear on different parts of the skin—vomiting of dark-coloured matter supervenes—and the sudden occurrence of alarming bleedings and *diarrhœa* soon terminates the scene in death.

The plague has appeared so often, and in so many places at different periods, that it would be endless to trace it through all the courses of its various ravages. Gibbon describes it as having nearly depopulated the earth in the reign of the Emperor Justinian. In 430, it visited Britain, and swept away most of those whom the sword and famine had spared, so that the living were scarcely sufficient to bury the dead.

About 1348, the most of Europe, including the British Isles, was visited by the plague, which caused a most fearful mortality. In Florence, above 60,000 people died of the disease. In 1656, the plague was brought from Sardinia to Naples, having been introduced into the city by a transport with soldiers on board. It raged with excessive violence, carrying off, in less than six months, 400,000 inhabitants. The daily number of the dead was sometimes 15,000. In 1665, the plague ravaged London, and cut off

no fewer than 100,000 individuals. It was raging to such an extent that, when at its height, not less than 8000 died in one week.* Throughout the different years of plague the mortality in London was 25 per cent.; for every fourth man, woman, and child was cut off.

Sir Richard Phillips says, "During the last great plague in London, one pit was dug in the Charter House, 40 feet long, 16 feet wide, and 20 feet deep, and in a fortnight received 1114 bodies. During this dire calamity there were instances of mothers carrying their own children to these public graves, and of people delirious, or in despair for the loss of friends, who threw themselves alive into the pits."†

Some of the family scenes during the plague in London are said to have been truly distressing. Anxious and worn-out relations and friends are represented as lying over the beds of the sufferers in melancholy reflection on the awful realities of the pestilence. And in 1720, when the plague visited Marseilles and cut off 60,000 people, the distress is said to have been truly heart-rending. There are two fine pictures by Paget representing some of the horrid scenes of that time. " They are (says Lady Craven) only too well executed. I saw several dying figures taking leave of their friends, and looking their last anxious and wishful prayers on their sick infants, that made the tears flow down my cheeks. I was told the physicians and noblemen who were assisting the sick and dying were all portraits. I can easily conceive it; for in some faces there is a look of reflection and concern which could only be drawn from the life."‡

*Cholera Morbus.*—The epidemic cholera which visited the most of Europe lately, differed in many particulars from those affections formerly known by the term cholera. Until the cholera morbus appeared in the northern parts of Europe, it was always considered an intertropical dis-

* Encyclopædia Britannica.

† Million of Facts. ‡ Encyclopædia Britannica.

ease, but its appearance in Russia in 1830 set that question at rest.

Since 1817 cholera has, at certain seasons, prevailed more or less in the East Indies, and especially in Calcutta, which city was dreadfully ravaged by it in 1817–18. In the beginning of 1819 it appeared in Ceylon. In 1821 it first made its appearance in Persia, where it lingered for some years. In 1829 the disease appeared in Orenburg, on the Tartar frontier, 400 miles north of the Caspian. It continued in the city for about three months; but extended 200 miles northward, about the same distance northwest, and about 80 miles westward. In 1830, about the middle of November, it arrived in Moscow, and was soon diffused over the whole Russian dominions.* It then spread over a great part of continental Europe, and appeared in Britain in the end of 1831.

The cholera, as it appeared in this country, had all the characters of an epidemic disease, occasioned by some peculiar state of the atmosphere. The eccentricity of its course, and the manner in which it spread in the most of places, showed distinctly that it depended on atmospheric influences. If it had been either a contagious or an infectious disease it would have spread from the centre to the circumference, and not as it did—cases appearing at the sametime in the most distant localities of the different cities and towns which it visited. Indeed, every circumstance connected with its appearance tends to show that its cause must be looked for in some atmospheric influences; but we do not pretend to say that it did not first originate in some endemic source; for it has prevailed about Calcutta and other parts of the East Indies since 1817. This being the case, we may ascribe its origin to some endemic causes there; and the disease being once established, the noxious influence would extend over other

* Glasgow Medical Journal—Edinburgh Medical Journal.

tracts of country, according to the prevailing currents of the atmosphere.

The first effects of cholera are chiefly manifested on the nerves of organic life, and more particularly on those which supply the digestive, respiratory, and vocal organs. Genuine cholera usually sets in with vomiting and bilious diarrhœa, to such an extent as to threaten almost immediate dissolution. These symptoms are accompanied with severe pain of the stomach, griping of the bowels, difficulty of breathing, and great anxiety of countenance. The whole features are shrunk, and evince a bitter feeling—the nose is sharp—the lips are thin and pinched—the voice is much altered—the eyes are sunk in their sockets—the pulse is small—the extremities are cold—the nails and skin are black—and the whole body appears shrivelled. The individual suffers all the time from violent cramps of the extremities, and, although reduced to the most wretched and most agonizing state, he continues sensible almost to the last. Such are the usual symptoms which attend cholera—a disease from which, *in genuine cases*, not one out of four recovers, at least such is the conclusion the writer came to from what he witnessed in the Glasgow Cholera Hospital.

The mortality during the late epidemic was truly melancholy. Individuals, who were in apparent good health in the morning, were ere night consigned to the cholera pit with dozens of their fellow mortals.

As the writer has not been able to procure any regular statistical accounts regarding the actual mortality from cholera throughout the country, his information on that point is very limited indeed. In Paris, there died of the cholera 18,000, 11 *of which number was connected with the Faculty*. In Quebec, 2,000 died—1 in 20 of the population. According to Dr Cleland, in Glasgow there were 6208 cases and 3005 deaths, which gives 3203 recoveries. There was one case to about every 32½ individuals, and one death to about every 67½. If the epidemic

had continued the whole year at the same rate, it would have cut off 3756 or 1 in 54 of the population. In Edinburgh, about 1200 died of the cholera. In Dundee there were 808 cases, and 512 deaths, or one for about every 88 of the population. In the army, during the three years the cholera prevailed, about 2.8 per thousand of the troops were cut off annually. It is something remarkable that the proportion of deaths amongst the troops quartered in various parts of the kingdom was almost to a fraction the same—so uniformly fatal was the prevailing pestilence.

According to Mr George Budd, physician to the Seamen's Hospital, of 160 cases of cholera, 93 terminated fatally, which is about $58\frac{1}{2}$ per cent., or 1 death to 1.72 cases. "At first the number of deaths was double the recoveries, but toward the end of the epidemic about half the number only. In the Echo, cholera vessel, however, such disparity did not occur." "Mortality was much influenced by age, being least in persons between the ages of 15 and 30, and greatest in those above 50. Of 13 whose ages exceeded 53 not one recovered. Liability to the disease was least between the ages of 20 and 30, but it increased much with advancing life, just as has been found by M. Grisolle to be the case with susceptibility to the poison of lead. Deranged health he likewise found to be unfavourable to recovery; for the proportional mortality was greater in persons affected with cholera who belonged to the hospital ship, the Dreadnought, than in those who were previously healthy."*

*Influenza.*—During some late years, influenza has often prevailed as an epidemic to a very great extent. Although it is by no means such an alarming or fatal disease as cholera, during the spring and summer of 1837 it cut off immense numbers of the aged throughout the whole country.

* Edinburgh Medical Journal, Medical Chirurgical Transactions, 1839.

Influenza attacks different individuals in very different ways. In general, it comes on with a sort of listlessness, slight fever, and great prostration of strength. Its continuance and course varies with the constitution and the age of the individual. In young people, the symptoms are generally rather of an acute character, resembling in many respects those of catarrhal fever, but accompanied with the great languor and listlessness so characteristic of the disease. In old people, the symptoms, though possessing many of the characteristics of catarrhal fever, are rather of the acute typhoid description—there is a lurid flushing of the countenance, with irritative fever and well marked appearances of complete breaking up of the system ; a great secretion of the bronchial mucous membrane takes place, and death follows, as in suffocative catarrh.

Influenza, like all other epidemics, seems to arise from a certain state of the atmosphere. The first impression of the disease is chiefly on the sensible organic system of nerves, but it very soon comes to affect those more intimately connected with all the functions of animal and organic life.

The mortality throughout the country, from influenza, in 1837, was thought to be greater than that from cholera. It was certainly very great amongst people up in years, but we have not the means of knowing the actual amount of deaths. If we can, however, venture to draw an inference from the London Bills of Mortality and the Registration, it appears that the number of deaths each month, during the prevalence of the epidemic, was about double that of the general monthly average.

Dr Alison states that, within a very few years previous to 1836, more than 1200 of the population of Edinburgh died of influenza.* Dr Cowan says, "Epidemic catarrh, or influenza, visited this city (Glasgow) in the month of December 1836; but its effects on the mortality bill were

* On the Management of the Poor of Scotland, 1840, p. 3.

barely perceptible till the month of January 1837. It continued to prevail during February and the first weeks of March, but in a modified degree. In April, the deaths from influenza were only 13. The total number of deaths recorded from influenza in 1837, amounted to 389, of which 229 took place in January, proving that the great force of the epidemic was expended during that month. * * * Influenza, unlike fever, was more fatal to females than to males."* In the rural district (Markinch) in which the writer practises, influenza was very fatal to aged individuals, and particularly to females, during January and February 1837.

According to the Dundee Bills of Mortality, during the three years 1837-8-9, there were 128 deaths from influenza, 108 *of which occurred in* 1837.

In Copenhagen, as recorded by Dr Otto, there were at least 30,000 persons under the disease (influenza) at one time early in January.†

*Small-Pox.*—This very severe *pustular* disease assumes different modifications, according to the temperament and constitution of the individual. Since vaccination became so universally practised, it has generally appeared in a mild or modified form; but we have still numerous cases of severe *confluent* small-pox, and particularly within the last six years, in some of our large towns, as Glasgow, the disease has proved very fatal amongst the young. The most general cause of death, in small-pox, is determination to some of the internal vital organs, mostly the lungs, which cuts off the patient as in other internal affections: but, occasionally, the great weakness induced by the disease ends in general marasmus or a broken-down state of the system.

According to Mr Moore, the small-pox originated in China about 1120 B.C., and that the Chinese tried inno-

* Vital Statistics, pp. 40, 50.
† Dr Holland's Medical Notes and Reflections.

culation for it about 590 A.C. An Arabian author mentions its appearance in Arabia in 572. In 1732, the Saracens spread it, and the measles, in Spain and France.

Previous to the introduction of vaccination by Dr Jenner, in 1798, small-pox was a most dreadful pestilence. In 1795, when the population of the British isles was 15 millions, it was calculated that the enormous proportion of 36,000, or 1-420th part of the whole population, died annually from small-pox, which was 11 per cent. of the whole mortality. In France and other countries, the proportion was still higher.

In Sweden, in the year 1779, the small-pox destroyed 15,000 individuals; in 1784, 12,000; in 1800, 12,800; in 1801, 6,000; in 1822, 11; in 1823, 37. Vaccination is strictly enforced by the government of Sweden, and the beneficial results are very striking in the above numerical statements.*

In London, previous to vaccination, the annual mortality from small-pox was about 4000. In 1835, according to the General Mortality Bill, it was only 536, and during 1837 it was only 300.

Notwithstanding the influence of vaccination in modifying, or in preventing small-pox, it appears from the report of the Registrar General for 1838, that throughout England and Wales no fewer than 11,622 died of the disease that year; and, according to the report, it further appears that early vaccination, that is, within the first three months of infancy, is most efficacious either in modifying, or in preventing the disease altogether.

According to Dr Gregory, physician to the Small-pox Hospital in London, vaccination exerts a very great influence in counteracting the fatal effects of the disease. "Of the unvaccinated there died at the rate of 40 per cent., or 1 in 2½, which is in the same ratio as the deaths from small-pox in 1781. Of the vaccinated 8 per cent.

* Hawkins' Medical Statistics.

died, or 1 in 12½, and the severity of the disease increased materially with age."*

The following quotation from the report of the Registrar General shows the extent to which small-pox has lately prevailed throughout England:—

"When the Registration Act came into operation, the epidemic of small-pox had commenced, and was rapidly advancing. It was raging at its height on the western side of the island. In Liverpool and West Derby 458 individuals perished, and were registered under small-pox, in the first three months. Bath, with a much smaller population, lost 154 lives; Leicester, 43; Shrewsbury, 35. The epidemic prevailed in the south-west counties in autumn, extending to the districts around Bath, and then passing from Somersetshire to Devonshire, where it destroyed 131 lives in Exeter, and half as many more in the surrounding districts; and to Wiltshire, where 40 died in Calne, Marlborough, and Pewsey, 48 in Devizes, and 22 in Salisbury. It penetrated further into the country; 64 died in Wycombe, 72 in Wolverhampton, 57 in Blackburn, 99 in Wigan. The deaths from small-pox in Wales were tripled; 69 died in Wregham, 85 in Abergavenny and Pontypool, 54 in Merthyr Tydvil. The hills and the valleys of Wales were traversed, and 711 victims were cut off, in the third quarter, the winter of 1838. The disease hovered over the metropolis at the first—22 died in Holborn, 10 in Whitechapel, 16 in St George's, Southwark, 29 in Lambeth, 47 in Greenwich; the deaths from it were doubled in the second quarter: 753 perished in the winter of 1838. The surrounding districts were infected, Richmond, Kingston, Brentford, Staines, and Uxbridge.

"The small-pox mortality attained its maximum in the spring of 1838; the metropolis saw 1145 carried to premature graves; Surrey lost 83 by the malady; Kent, 132;

* Medico-Chir. Transactions, vol. xxii., 1839; Edinburgh Medical Journal, April 1840.

Berkshire, 64; Wiltshire, 93; Somersetshire, 222; Gloucestershire, 142; Worcestershire, 89; Warwickshire, 107; Lancashire, 442; Yorkshire, 282; Durham, 88; Cumberland, 44; Monmouthshire, 82; Wales, 515. In three months, 4489 deaths from small-pox were registered. The epidemic paused, either because its strength was exhausted or its victims failed; yet 3685 fell under its hands in summer, 3851 in autumn."

According to the inquiries of Dr Hall, previous to the practice of vaccination, small-pox had raged to a fearful extent in Glasgow. In the period of 10 years, betwixt 1783 and 1792 inclusive, there were 9919 deaths under 10 years of age, 3466 of which were from small-pox. In the next period of 10 years, from 1793 to 1802, there were 9080 under 10 years of age, of which 2894 were from small-pox. In the next period of 10 years, from 1803 to 1812 inclusive, there were 10,913 deaths under 10 years of age, of which there were only 1013 from the small-pox. So, during these three periods, the number of deaths from small-pox, in proportion to the whole deaths under 10 years of age, were just about 36, 32, and 9 per cent. respectively to each period, which certainly shows a very great diminution of the mortality from this disease. Of the great advantages which have accrued from vaccination, Dr Cowan makes the following very judicious observations, in reference to the above statements, which we have extracted from his Statistics of Small-pox in Glasgow:—

"The saving of human life in infancy, by the introduction of vaccination, is thus most satisfactorily established, as the table (from which the above deductions are drawn) shows an improvement to the extent of 25 per cent.; and if to this be added the lives saved above ten years of age, which we have no means of exhibiting from the Glasgow Mortality Bills, we will be able to judge of the benefits conferred on society by Jenner." Dr Cowan goes on to say—

"I am not aware that small-pox was so fatal in any town as it appears to have been in Glasgow. In Berlin, the deaths from small-pox were for a short time as 1 in 4, but more generally as 1 in 7 of the whole deaths under 10 years of age, while in the city and suburbs of Glasgow it was fatal in the proportion of 1 in 3 of the deaths under 10 years, and that not for one or two years merely, but for a long period.

"The great saving of human life is rendered apparent from the third period embraced in the table. Up to the very moment of small-pox inoculation being superseded by cow-pox, the mortality is immense, and the instant the latter is employed, the mortality becomes trifling in comparison. * * *

"The following table gives the deaths from small-pox, according to the Mortality Bills for 1835–36, but does not include the whole of them, as the causes of death were not ascertained in many instances; and at the Tolcross burying-ground, in which the interments, in 1835–36, amounted to 645, the diseases have not been recorded.

"*Table of the Deaths from Small-pox*, 1835-36.

| | Under 1 year. | 1 to 2. | 2 to 5. | 5 to 10. | Above 10. | Total. |
|---|---|---|---|---|---|---|
| 1835, | 204 | 154 | 75 | 17 | 23 | 473 |
| 1836, | 202 | 174 | 144 | 23 | 34 | 577 |
| | 406 | 328 | 219 | 40 | 57 | 1050 |

"The annual average number of deaths, under 10 years of age, for 10 years prior to 1812, from small-pox, was 101; while, during the 2 last years, they have amounted to 903."

These numerical statements of Dr Cowan show distinctly that the prevalence of small-pox has been very much on the increase for some years past in Glasgow; and such is also the case throughout the whole of the island. This renewal of the frequent occurrence of this disease amongst us is attributed to the want of proper vacci-

nation. Dr Cowan states that of 95 patients under small-pox, who were treated by him in the Infirmary, 55 "had apparently been vaccinated, and forty never had this operation performed. Nearly one-half of the Highlanders had marks on their arms, but these were not in general the result of what I would consider perfect vaccination." Dr Cowan remarks that very few Irish have been admitted into the Infirmary for small-pox. Of 95 admissions, there were 70 Highlanders, 21 Lowlanders, and only 4 Irish. He attributes the immunity of the Irish from small-pox to the perfect manner in which vaccination is performed among the lower classes by the surgeons of the country, and in the dispensaries in Ireland; and he says, "To the neglect of vaccination, and to the practice of it with impure lymph (matter), deteriorated perhaps in the transmission, must be ascribed the prevalence of small-pox among the Highlanders. * * The increasing prevalence of small-pox should attract the attention of the public. It is a disease which has caused a mortality, during the last 10 years, only inferior to that of typhus, and it is one which could be eradicated, under proper management, at a trifling expense. * * Let the proper steps be taken, and the result would soon be apparent in a diminished mortality of the infantile population of Glasgow." The justness of these remarks of Dr Cowan are strongly corroborated by what we have already mentioned regarding small-pox in Sweden. There vaccination is so enforced by the government, that, in 1822, as we stated, there were only 11 deaths from the disease in the whole of Sweden—whereas, in 1779, nineteen years prior to that in which Dr Jenner promulgated his discovery of vaccination, there were 15,000!

Dr Cowan says, "The increasing rate of mortality in the city of Glasgow * * has been ascribed solely to the prevalence of fever; but this cause has acted chiefly on the adult population, and consequently has been limited in the extent of its operation."

| | | |
|---|---|---|
| In 1835 and 36, the deaths from fever were | | 1253 |
| ... ... ... | From small-pox, | 1050 |
| | | 2303 |

Of the deaths from fever, 186 were under 10 years of age, and of those from small-pox, 993 were under 10 years of age.*

According to the Dundee Bills of Mortality there were in that town—

| | | | | | | |
|---|---|---|---|---|---|---|
| In 1837—136 | deaths from small-pox; from fever, | | | | | 114 |
| In 1838— 9 | ... | ... | ... | ... | | 197 |
| In 1839— 77 | ... | ... | ... | ... | | 177 |
| 222 | | | | | | 488 |

In Dundee, it appears that the prevalence of small-pox and fever has varied considerably during the above periods. In 1836, when small-pox prevailed most, there were only 114 cases of fever; but in 1838 and 39, when small-pox was much less prevalent, there were 197 and 177 cases respectively, which is a pretty close approximation to a corresponding ratio in the increase and decrease of both of the diseases, in relation to the prevalence of each.

* See Vital Statistics of Glasgow, by Dr Cowan, pp. 29—32.

## CHAPTER IV.

Death from Drowning, Strangulation, Suffocation, Decapitation, Precipitation, Wounds, Surgical Operations, Starvation, extreme Cold, Lightning, Poisoning, and Mental Emotions.

*Drowning.*—There are more suicides and accidental deaths from drowning than from any other means. That it should be the method of death generally chosen by those intending to commit *suicide,* is not surprising; for, besides being the most convenient, we are inclined to think it not the most painful mode, either as affecting its victims or the feelings of relations.

The effect of submersion in water, for a certain length of time, is the production of *asphyxia*, which is a cessation of the vital functions, namely, the suspension of the action of the heart and lungs, produced by a total or partial suspension of the nervous energy of the brain and spinal marrow.

*Asphyxia* from drowning, then, is the effect of *suffocation,* produced by the total exclusion of air from the lungs. In drowning, suffocation does not arise, as is commonly supposed, from the water entering the windpipe and filling the lungs, but merely from the effect produced upon the opening into the windpipe, by the water causing such a complete spasm of the muscles of that aperture as to close it completely. Under such circumstances the action of the lungs immediately ceases, and the circulation and nervous *irritability* throughout the whole system gradually becomes extinct.

If a person have been under water for only 5 or 10 minutes, recovery is pretty certain, provided the requisite means of resuscitation be promptly and judiciously used; but if length of time has elapsed, say from 15 minutes to half an hour, sufficient for the extinction of all *nervous ir-*

*ritability*, the means used for recovery will be in vain. The length of time required for complete extinction of life, or *nervous irritability*, varies in different individuals ; for some have not recovered after submersion for the short period of five minutes only, whilst others have recovered after twenty minutes. We have cases of recovery recorded even after half an hour ; but, generally speaking, submersion for 20 minutes is fatal. It has always been thought that drowning is a very easy death. This is partly conjecture ; but it is supported by the statements of those who have been submersed for a certain time and brought round. The feeling has been compared to that of falling asleep, or drowsiness, which is very likely pretty correct, for the *general* effect upon the system, so far as we have had opportunity of observing in cases of drowning, seems to be an universal and gradual *dying away* of sensation. There are no violent convulsions, or nervous twitches, indicative of excessive or severe action of any individual part of the nervous system. The whole seems one somnific swim to death !

> "Ere hope sensation fails—
> Receives, not suffers, death's tremendous blow."

The number of lives lost by drowning must be very great. It is computed that not fewer than 150 lose their life annually, either wilfully or accidentally, from drowning in London. In and about Paris the number is said to be very great, and mostly suicides.

We have not the requisite knowledge for coming to any thing like a correct estimate of the number drowned at sea. It is very astonishing that the public are so indifferent as to the chief cause of shipwreck, namely, the insufficiency of vessels. Mr Ballingall, late of Kirkaldy, Fifeshire, in a very able pamphlet, has shown, in the most satisfactory manner, that shipwreck may be generally attributed to the insufficiency of vessels from defective shipbuilding. The following quotation from Mr Ballingall's excellent little work will give the reader some idea of the

immense loss, both of life and property, which Britain sustains from this cause alone :—

"The losses borne by the public, in consequence of the system, we estimate at far above a million a-year, while we have reason to think *it also causes the death of above two thousand British subjects annually*. The ships lately foundered and wrecked with emigrants to Quebec, and of which the *Montreal Gazette* gives a list of 18 in the spring of this year, are clear proof of the effect, and part and parcel of the nefarious system. About 700 human beings have been drowned in these vessels lately. It is more annoying, too, to think that the property lost does not benefit any human being, except the parties by whom the system has been devised, but is swallowed up in the sea. It is high time the public mind was opened on this most important subject. *The public are actually paying for the destruction of their fellow-creatures.*"*

In order to show the number of lives lost by steam-boat accidents, as compared with the *annual* loss of life from sailing vessels, we will insert an article from the *London Courier* on this subject :—

"*Abstract of Ninety-Two Accidents.*

| Vessels. | | Ascertained number of lives lost. |
|---|---|---|
| 40 | Wrecked, foundered, or in imminent peril . | 308 |
| 23 | Explosions of boilers . . . . . | 77 |
| 17 | Fires from various causes . . . | 2 |
| 12 | Collisions . . . . . . | 66 |
| 92 | | 453 |
| | Computed number of persons lost on board the Erin, Frolic, and Superb, . . . | 120 |
| | From watermen's and coroners' lists, in the Thames, exclusive of the above, during the last three years, . . . . . | 40 |
| | From a list obtained in Scotland, exclusive of the above, being accidents in the Clyde, during the last ten years, . . . . | 21 |
| | | 634 |

* Pernicious Effects of Sea Insurance.

| | |
|---|---|
| The greatest ascertained number of lives lost at any one time, occurred by the wreck of the Rothsay Castle, when | 119 persons perished. |
| The greatest number at any one time from collision, . . . . | 62 |
| The greatest number at any one time from explosion, . . . | 24 |
| The greatest number at any one time from fire, . . . . | 2 |

"In comparing the loss of life in sailing vessels and in steam vessels, we have the advantage of the labours of a Parliamentary Committee appointed in 1836. From their report we ascertain that the annual loss by the shipwreck of sailing vessels is three millions of property and one thousand lives. It may be alleged that this great extent of loss is to be accounted for by the greater extent of our sailing than of our steam marine. But, on examination, it does not appear so. The Monthly Chronicle shows, that 'it appears from Mr Porter's tables, that, in 1836, Great Britain and her colonies owned 25,000 vessels, of an aggregate tonnage of nearly 2,800,000.' We have seen that, in 1835, the vessels lost were 550 in number. Assuming the same loss for the ensuing year, we have one shipwreck for every 45 vessels afloat.

"*Accidents by Steamers on the Thames.*

| | |
|---|---|
| Number of persons drowned or otherwise killed by steamers upsetting boats, &c., . . . . . | 43 |
| Number of persons who sustained bodily injuries, . | 5 |
| Number of persons thrown into the water, but saved from drowning, . . . . . . | 72 |
| Total personal accidents, . | 120 |
| Number of wherries, barges, smacks, and other craft sunk and injured by steamers, . . . . | 59 |
| Number of steamers seriously damaged by collision with each other, . . . . . . . | 12 |
| Total accidents to vessels, . | 71" |

*Death from Strangulation.*—Death from hanging or strangulation resembles, in some respects, death from

drowning, being chiefly the result of suffocation. But the effects of strangulation are much more severe, and are certainly more horrible.

Besides the feeling of suffocation, produced in strangulation, there must also be considerable pain from the tightness of the rope or ligature round the neck. In cases of public hanging dislocation of one of the upper *vertebræ* of the neck is sometimes produced, either from *the length of the drop*, or from the unfortunate individual making a sudden jump on the falling of the platform, in order to produce more sudden death. Dislocation of the neck can seldom take place in suicidal hanging, unless done in a very determined and efficient manner.

That death from strangulation is entirely the result of suffocation, as in drowning, has been proved by experiment. If a dog be suspended by the neck, and an opening made into his windpipe below the rope or ligature, he may hang for hours and not be dead. The reason is, that the lungs continue to play from the air being respired through the opening into the windpipe, just as in natural breathing. It is the action of the lungs, &c., which gives rise to the alternate taking in and forcing out of the air; so, as long as they are supplied with air, and their nervous energy is kept up, breathing will go on—the circulation will be continued—and life will be kept up accordingly.

Individuals who have been suspended for only a short time may be restored to life again by inflation of the lungs and other means of recovery, provided there be no dislocation of the neck; but recovery depends entirely on the length of time elapsed, for, if the *nervous irritability* be gone, it is quite impossible. There is a very singular case, given in Hooper's Medical Dictionary, recorded by Dr Plott, of a woman named Inetta de Balsham, who was hung in the reign of Henry VI. She was suspended in the usual way, and hung from nine o'clock on Monday till later than sunrise on the ensuing Tuesday, and, to the astonishment of all, was cut down alive! The king pardon-

ed her. Dr Plott says "she could not be hanged, upon account that the *larynx*, or upper part of her windpipe, was turned into bone."

It has been considered quite practicable to save the life of a criminal condemned to be hanged, by introducing a silver tube into the windpipe, in order to prevent the girding of the rope from closing that tube. Such an experiment could only be executed with great difficulty; indeed, it seems scarcely practicable so as to escape detection, for the presence of any thing in the windpipe always gives rise to such symptoms of irritation, as coughing, &c. which would to a certainty lead to discovery.

In the College of Glasgow, there were some very interesting and curious experiments performed on the body of one Clydesdale, who was executed in that city many years ago for murder. We cannot enter into all the details of the experiments here, but we may give a short abstract of them. The curious reader will find the whole given at great length and with great talent by Dr Ure in his *Dictionary of Chemistry*, article Galvanism. The galvanic experiments were performed by Dr Ure, under the superintendence of Dr Jeffray, Professor of Anatomy in the College, and the dissections were made by Mr Marshall, Dr Jeffray's assistant.

Dr Ure says, "The subject of these experiments was a middle-sized, athletic, and extremely muscular man, about thirty years of age. He was suspended from the gallows nearly an hour, and made no convulsive struggle after he dropped, while a thief executed along with him was violently agitated for a considerable time. He was brought to the anatomical theatre of our University in about ten minutes after he was cut down. His face had a perfectly natural aspect, being neither livid nor tumefied, and there was no dislocation of the neck."

Experiment 1. The spinal marrow, at the nape of the neck, and the sciatic nerve, at the hip, having been brought into view, and a small cut being made in the heel, "The

pointed rod connected with one end of the galvanic battery was now placed in contact with the spinal marrow, while the other rod was applied to the sciatic nerve. Every muscle of the body was immediately agitated with convulsive movements, resembling a violent shuddering from cold. The left side was most powerfully convulsed at each renewal of the electric contact. On moving the second rod from the hip to the heel, the knee being previously bent, the leg was thrown out with such violence as nearly to overturn one of the assistants, who in vain attempted to prevent its extension."

Exp. 2. The left phrenic nerve was laid bare in the neck—(This nerve is distributed to the diaphragm, the chief muscle of respiration ; it also communicates with the heart)—and a small incision was made under the cartilage of the seventh rib. "The point of the one insulating rod was brought into contact with the great head of the diaphragm. * * * The success of it was truly wonderful. Full, nay laborious, breathing instantly commenced—the chest heaved and fell—the belly was protruded, and again collapsed, with the relaxing and retiring diaphragm. This process was continued, without interruption, as long as I continued the electric discharges.

"In the judgment of many scientific gentlemen, who witnessed the scene, this respiratory experiment was perhaps the most striking ever made with a philosophical apparatus. Let it also be remembered, that for full half an hour before this period the body had been wellnigh drained of its blood, and the spinal marrow severely lacerated. No pulsation could be perceived, meanwhile, at the heart or wrist ; but it may be supposed that, but for the evacuation of the blood—the essential stimulus of that organ—this phenomenon might also have occurred.

"Exp. 3. The supra-orbital nerve was laid bare in the forehead, as it issues through the supra-ciliary *foramen* in the eyebrow—the one conducting rod being applied to it, and the other to the heel. Most extraordinary

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grimaces were exhibited every time that the electric discharges were made. * * Every muscle in his countenance was simultaneously thrown into fearful action —rage, horror, despair, anguish, and ghastly smiles, united their hideous expression in the murderer's face, surpassing far the wildest representations of a Fuseli or a Kean. At this period, several of the spectators were forced to leave the apartment from terror or sickness, and one gentleman fainted.

"Exp. 4. The last galvanic experiment consisted in transmitting the electric power from the spinal marrow to the ulnar nerve, as it passes by the internal condyle at the elbow. The fingers now moved nimbly, like those of a violin performer; an assistant, who tried to close the fist, found the hand to open forcibly, in spite of his efforts. When the rod was applied to a slight incision in the tip of the forefinger, the fist being previously clenched, that finger extended instantly; and, from the convulsive agitation of the arm, he seemed to point to the different spectators, some of whom thought he had come to life."

About half an hour was spent in these operations. Dr Ure was of opinion that, if the experiments had been gone about in the way he first thought of, the life of the murderer might have been restored.

*Suffocation from Gases.*—In *asphyxia* from suffocating gases, death in some instances supervenes very rapidly. The gases which affect the system in this way occur most commonly in mines and coal-pits, and are usually called *damps*. The most common of these are *carburreted hydrogen* and *carbonic acid gas*—the former is usually called *fire damp*, the latter *choke damp*. The carburreted hydrogen is that gas which gives rise to the terrible explosions in mines and coal-pits, from which so many unfortunate individuals lose their lives. It is the common gas employed for lighting our towns, and has, as every one knows, a very disagreeable smell, and is very suffocative when breathed. It does not usually exist in

mines in such a state of condensation as to produce imminent suffocation, but the awful effects of its explosions from the miners' lights are too common indeed. Many hundreds of our fellow-creatures have come to their death by the horrid, violent, and scorching, effects of the explosions of this gas in our coal-pits.

*Carbonic acid gas*, commonly called fixed air, from its heaviness, and choke damp, from the instantaneous suffocation which it produces, collects in old pits and mines, and in close rooms from charcoal fires. It very often collects at the bottom of wells and natural caverns, and always exists at the bottom of large beer casks and brewers' vats. As it has no smell nor appearance, its presence cannot be known previous to its effects. If a lighted candle be put down into any pit or vessel containing it, the flame is immediately extinguished. It also extinguishes life in a very few seconds. There is a cave in the side of a mountain in Naples, called the Grotto del Cano, the bottom of which is constantly covered with this gas. If a dog or any other animal, with its head not higher than the top of the *stratum* of the fixed air, be forced in, it immediately drops down dead. This gas, when collected in a jar, and poured over a lighted candle, or any small animal, placed in the bottom of a vessel, extinguishes both light and life almost instantaneously.

Animal matter, after being long buried up, produces a very powerful suffocative gas. It often issues from the coffins of the dead, when any accidental exposure of a corpse has been made, and produces the most fearful effects on those subjected to its influence. Grave-diggers, so circumstanced, have often been struck down in an instant quite senseless, and apparently lifeless. Individuals, situated at a greater distance, have been affected with nausea, giddiness, convulsions, and faintings for some hours.

The powerful effects of these gases is first upon the respiratory organs, through the medium of which they

instantaneously affect the brain, and consequently the whole nervous system.

Although death results from suffocation in a variety of ways, the consecutive effects are always similar, but, of course, modified according to the influence of the specific cause.

*Death from Decapitation.*—Beheading is allowed to be the least painful mode of death, when it is properly performed. Of all instruments for this operation, the guillotine is certainly the best.

Since the brain is the source of all mental and sensitive associations, when the head is completely struck off, we would be inclined to think, that all conscious sensation would be at an end—that the relative associations of the whole nervous system would be so completely deranged as to cause complete extinction of all appreciable sensation from any impressions whatever.

But, strange to say, *philosophy* has really taken it upon herself to be sceptical even on these things; she will not allow

> That when the *head* is *off*, the *head is dead*
> To every thought and action.

No, some philosophers are of opinion that consciousness does not cease for some time after decapitation—they have beheld, or they have been told by those who did behold, the mute but conscious signs of heads without a body! It is said that the lips of Mary Queen of Scots moved and prayed for a quarter of an hour after she was beheaded. "As the word 'murder' was called into the ear of a criminal who was executed for this crime at Coblentz, the half-closed eyes opened wide, and he stared with an expression of astonishment at those who stood before him." "Wendt relates, that, having put his mouth to the criminal's ear, and called him by name, the eyes (of the decapitated) turned to the side from which the sound came."*

* Medical Gazette, 1836; The Philosophy of Decapitation.

Such statements are truly an appalling addition "*To what we fear of death.*"

But really there may be some truth in them; for, when we consider that all the nerves of sight, taste, smell, and hearing, in short, the nerves of our senses, arise directly from the brain, *within the skull*, it does not require an extraordinary stretch of imagination to conceive the possibility of some degree of consciousness remaining for a few seconds after decapitation.

*Consciousness*, or at least the limited manifestations of it, very often remain for some time after very violent injuries both of the brain and spinal marrow. Now, as beheading, in the first instance, *only* severs the brain and spinal system, the former will not, perhaps, be more immediately deranged in its *peculiar* functions than in many other severe injuries affecting chiefly its various nervous functions and associations. The consecutive effects, namely, the complete extinction of its *irritability*, will depend altogether on the peculiar *temperament* of the individual, just as in other cases. In some cases of drowning, the irritability is not gone even after half an hour, in others it is gone in five or ten minutes. So we are inclined to think that, in some brains, a modified degree of consciousness may remain for a few minutes after decapitation. It may appear wonderful, but analogous reasoning forces some belief in the possibility of the thing.

*Death from Precipitation and other Causes.*—When an individual falls from a height, the effects are always more or less serious, according to the height of the fall, the nature of the body fallen upon, the part which is injured, and the weight of the individual. As the different effects produced under these circumstances are so well known, it is not necessary to enter into particulars, so we will only consider briefly some of the injuries which usually prove fatal.

The most common cause of death from falling, either

from a height, or otherwise, so as to pitch upon the head, is fracture of the skull accompanied with some injury done to the brain. Fracture of the skull is very generally followed with effusion of blood into some part of the brain, and also by inflammation either of its substance or membranes, very generally of both. When the brain is compressed, either from the effusion of blood, or from a portion of the bone being beat in, there generally exists paralysis to a greater or less extent. The paralysis or palsy in such cases is usually partial, that is, confined to some particular part or parts, the reason of which is, that the injury at first tells more upon some parts of the brain than upon others, and, consequently, affects more those particular nerves over which that portion of the brain presides.

In severe cases of fracture of the skull, with depression of the bone and effusion of blood upon the brain, the apparent sensibility of the patient often appears quite extinct. He lies on his back in a complete apoplectic state—the pupils are wide—the breathing is laborious, loud, and stertorous—the pulse is labouring and slow—all external consciousness seems to be gone—in short, he appears a mere breathing machine, there being only a continuance of some of the vital functions through the instrumentality of the organic system of nerves. Such are the symptoms which usually accompany pressure upon the brain. The individual may survive, in the above senseless state, for some days, but death generally takes place within forty-eight hours. In such cases the cause of death is too evident; for, upon examining the brain after death, effusion of blood or extensive injury of the substance of the brain itself is very generally found.

Death, from wounds of different kinds, takes place more or less rapidly according to the nature of the parts injured. When a large blood vessel is torn or cut across in any of the vital organs, say from a musket ball or any cutting weapon, death is usually very sudden, from the great and rapid effusion of blood, and from the consequent shock given

to the nervous system. Such is also the case when any of the principal blood vessels are ruptured, either from the effects of disease, or from any kind of violent injury.

All deep wounds attended with injury of any of the vital organs are very generally fatal. Deep wounds of the chest are invariably fatal, all the parts within being so important to life, and so abundantly supplied with large blood vessels. Injuries of the heart are very suddenly fatal, and so it is with those of the lungs. Wounds penetrating the *abdomen* or belly are generally very dangerous and fatal—not that they always produce immediate death, for there have been cases in which the instrument, besides laying open the cavity of the *abdomen*, had wounded the bowels, but which, nevertheless, have recovered. It is an astonishing fact that the bowels frequently escape the thrust of a knife or the passage of a ball through the belly; but the reason is, they glide so smoothly over each other, and are thus very readily displaced and put out of the way. Notwithstanding this, all wounds penetrating the abdomen usually prove fatal, from the violent inflammation of the *peritoneum* which ensues, and which, in the most of cases, is a very rapid and fatal disease itself. Fractures of the extremities frequently prove fatal in irritable patients from the inflammation and violent sympathetic fever which is so apt to supervene in severe cases. Fractures of the vertebræ and dislocations of the spine usually end in death, from the injury which the spinal marrow sustains; but, if the injury of the spinal marrow should not be so very serious, the case may end only in a partial paralysis. Severe bruises, with injuries of the joints, particularly those of the thumb, ankle, and knee, are very apt to end in *lock-jaw* and death.

The following quotation from the "Notes" of Mr Alcock will give the reader a very good idea of the comparative mortality from different injuries or wounds in the field of battle:—

"In considering the mortality in the different classes of

wounds, beginning with gunshot *injuries of the head* producing fracture, we find the general return gives 28 cases of fractured skulls, of which 22 died. * * *

"Scalp wounds, 61—2 only died.

"Penetrating wounds of thorax (chest), 38—2 discharged to duty.

"Penetrating wounds of both thorax and abdomen, 3 occurred, and all died.

"Penetrating wounds of the abdomen from gunshot, 19 —1 only recovered.

"Penetrating wounds of joints, 37 admitted into hospital—21 died.

"Gunshot fractures of the femur (thigh bone), 32—11 partial, 21 complete—of the 11 partial, 3 died—of the 21 complete, 16 died.

"Of gunshot fractures of the leg not complicated with injury to the joints, there were 57 cases, of which 20 died —1 to 2 17-20.

"Of gunshot fractures of the humerus (superior bone of the arm), not implicating joints, 31—of which 11 died—1 to 2 2-11.

"There were 52 cases of gunshot fracture of the hand and forearm, of which 3 died.

"The general severe wounds amount to 403, of which 45 died, as nearly as may be, one-ninth—9 of these from tetanus (lock-jaw.)" *

*Death from Surgical Operations.*—All *capital* operations are more or less dangerous, but, generally speaking, the fatal consequences do not depend so much upon the nature of the operation itself, as upon the circumstances under which it may be performed. An individual who has led a sober and regular life will have many more chances in his favour, in recovering from any operation, compared with one of an opposite character.

In cases of *amputation* after compound fractures, ac-

* Medical History of the British Legion in Spain.

companied with other bodily injuries, the termination is frequently fatal, from the constitutional irritative fever which often supervenes in such cases.

The operation for rupture, *hernia* (strangulation of the bowels), is very frequently fatal; because of the length of time which usually elapses before it is performed. In such cases, the intestine is more or less inflamed ; so the longer the operation is delayed, the more will the inflammation increase, and, consequently, will be the more apt to run to a fatal termination after the operation has been performed.

*Lithotomy* is by no means a fatal operation, when performed under favourable circumstances; but in a great many cases the operation is not performed until both the general and local effects of the disease have become such as greatly to diminish the chance of recovery. In such cases, the operation ought always to be performed in the earliest stage of the complaint, before much constitutional or local irritation is established.

The operation for *aneurism* (dilatation and disease of an artery) is perhaps fully as precarious as any of the above-mentioned—first, because of the disease often extending to a considerable extent along the course of the vessel ; and, secondly, from the local and general effects produced by the obstruction offered to the circulation. The operation for *cancer* of the breast, &c., seldom proves fatal in consequence of the operation itself, but the patient is very generally cut off afterwards from the recurrence of the malady.

The extirpation of *tumours* is generally a successful operation ; but when they are *very* large, the consecutive exhaustion of the patient, and the irritative fever together, frequently prove fatal. All *minor* operations, generally speaking, when properly performed, may be said to be free from danger.

According to numerical statements, derived both from hospital and private practice, it appears that *amputation* is rather a fatal operation—the deaths being as 1 in every

$4\frac{1}{2}$ cases. In *lithotomy* the proportion is much less; in *hernia* the proportion is reckoned higher than in either. That amputation, and the operation for hernia, should prove more frequently fatal than lithotomy, is not surprising; for the former are often performed under the most pressing emergencies, and consequently very frequently under the most disadvantageous circumstances in respect both to the local and general nature of the case; whereas, in lithotomy, the surgeon may operate at any time, and thus afford his patient a double chance of recovery, by putting his system into a better state previous to the operation being performed—an advantage which the cautious surgeon never loses sight of.

*Death from Starvation.*—Diseases and death, arising from a limited supply of food, are much more common in savage than in civilized nations; because, with the former, scarcity of provision is very frequently a necessary result of the casual circumstances which attend savage life, and which cannot be provided against; whereas, with the latter, there are always some previous recourse adopted to prevent such occurrences. In savage life, thousands of unhappy creatures are often cut off in the pangs of want, which usually occurs from their wandering, and consequently improvident, way of living. They frequently neglect to lay up stores against times of difficulty, and thus, by their indolence and neglect, incur all those distressing privations, of which we have so many horrible accounts in the different histories of India, and of many savage tribes, or nations. But we must confine ourselves more to the physical than to the politic causes of death as arising from actual want or starvation.*

The sensations of hunger are very differently felt by

* The reader who wishes particular information on the effects of limited means of subsistence upon population, will find a great collection of facts on this head in Mr Malthus's work "On Population," vol. i.

different individuals. In some the feeling amounts to actual pain, whilst others feel only a degree of uneasiness, accompanied with a sort of drawing sensation at the pit of the stomach. The immediate effects produced upon the system from long fasting, is a gradual feeling of faintness or weakness, accompanied with the sensation of hunger, as arising from the peculiar state of the stomach itself, and from the sympathetic effects which that gives rise to throughout the whole body through the influence of the nervous system. When the want of food has been sustained for a considerable time, all the bodily powers become reduced, in consequence of the body becoming more or less emaciated, which is the general symptom of the first stage of *inanition*, or that state of the system as induced by the suspension of the functions of nutrition. As the emaciation proceeds, all the vital powers flag in proportion ; the eyes appear sunk in their sockets—the skin has a wrinkled and an unhealthy dirty hue—the mind is peevish and irritable—and all the actions and manifestations evince a degree of inexpressible anguish. In the last stage of actual starvation, the whole body presents the most piteous aspect ; the cheeks have fallen in close to the jaws—the lips lie thin and tremulous over the bloodless gums and the apparently projecting teeth—the eyes are sunk and glazed, but a little red and wild looking—the mind wanders betwixt the anguish of bodily sensation and its own frenzied thoughts—ultimately delirium supervenes—the whole system appears one sunken spectacle—and the sufferer expires, a gradual prey to those gnawing sensations which are produced by each and every part of the body giving up its vital molecules to feed the embers of their preying vital powers. Of all deaths, actual starvation must be the most horrid.

According to the coroners' inquests in England in 1838, no fewer than 126 deaths are ascribed chiefly to starvation, which is about one in every 111,000 of the population. When such is really the case in England, what are we

to expect in Ireland—a country which is depressed to the zero of subsistence even as regards her peasantry. However, it does not appear that the word *starvation* is properly understood when applied to the sufferings of the poor Irish; for year after year passes away, and they are still found in the same miserable condition of neglect and misgovernment. The state of the labouring population in Ireland would be a disgrace even to a savage nation; their condition, at present, can only be estimated by picturing the amount of their privations in the absolute want of every common comfort in life—the want of food—the want of clothing—the want of shelter—in short, the want of every comfort which renders life worth the having. But we need not go out of Scotland to search after destitution. In the close narrow lanes, and in the confined courts of our crowded cities, as in Glasgow and Edinburgh, thousands of poor wretches contrive to eke out a miserable existence in damp underground apartments, with scarcely a sufficiency of food to keep their mortal frames alive to the gnawing sensations of hunger. But time puts a period to their misery, by their vital powers being gradually starved out of their existence. The misery from starvation in Glasgow is frightful, amongst those poor wretched individuals, whose wants are neither known nor cared for; and even in Edinburgh, it appears that the amount of the destitute is very great, and that it is, as in Glasgow, steadily increasing.* According to various accounts, the scenes of misery and gradual starvation are beyond all conception in some of the crowded parts of London. But even in the rural villages of Scotland, gradual starvation, yea, even death, from pretty rapid starvation, is by no means uncommon. Imagine some poor old man, or woman, betwixt eighty and ninety years of age, living alone upon ninepence a week—a common parochial allowance. Of such poor creatures there

* See Dr Alison on the Management of the Poor in Scotland.

are many in our beautiful rural villages, where all appear cheerful and healthy without; but we have only to ascend to the confined attic rooms of our low-roofed houses, there to discover poverty and starvation in village retirement, as ministered to and kept alive by parochial allowance. The writer invariably considers death, into such retired and melancholy scenes, as a welcome visiter; and, indeed, it seems to be also considered as such by the parish functionaries, as most charitably evinced in their often withholding the pittance which might be laid out in purchasing some of those *physical* and *medicinal* necessaries which would be the means of keeping the immortal spirit a few days, or perhaps years, longer within its mortal tenement of misery.

Such saving is true charity indeed!
To those the least concerned—to those who die.

But it may be said *that few die of actual starvation*. If limited means of sustenance—poor clothing—and wretched housing, bring on virulent and fatal diseases, are not these at once both the proximate and remote causes of death? The present parochial attentions and allowances to the wants of the poor are a mere mocking of suffering humanity, and a disgrace to the sacred and beautiful doctrines which were taught by Jesus Christ. If there did not thus exist a *nominal* system of relief for the indigent poor in Scotland, one of a more efficient nature would soon be adopted.

It is said, by an able reviewer, that "The rich in this country will only look after the poor when they find it their duty to do so. That case seems to be pretty well made out already. The poor are costing the other classes a smart sum in purse and person, and what with troops, constabulary, fever hospitals, and fevers, the account is running up pretty handsomely. So the legislature will try its hand at a nostrum anon."*

* Johnson's Medical Review, Oct. 1839.

*Death from Extreme Cold.*—The animal body, whilst alive, generates a sufficient quantity of heat within itself so as to keep up an almost uniform temperature of all its parts; but, like any other body possessing heat, it gives out its own to any colder body, or to any surrounding medium in which it may be placed. As we have already considered the general effects of cold in giving rise to different diseases, we will confine ourselves in this place to the *violent* effects of cold in bringing about that depression or prostration of the vital powers which ultimately ends in death.

Sometimes the continued and sudden application of cold to particular parts of the system has caused such a depression of the nervous and vascular energies, as to cause almost immediate death. Many individuals, from taking a large draught of cold water, have been seized with such inward congestion of the different alimentary organs, as ultimately to end in death, from the occurrence of violent consecutive inflammatory affections. The sudden and continued application of ice, or very cold spring water, to the head has been frequently followed by such depression of the vital energies, as either to prove suddenly fatal, or to give rise to a very alarming depression of the whole nervous system.

The primary effects of extreme cold, as affecting the nervous and vascular systems, give rise at first to slight symptoms of excitement, but these are soon followed by a marked depression of the animal spirits and of all the vital energies. The individual becomes stupid, dull, and restless, with an overwhelming inclination to lie down. All the external senses, along with the general sensation of the body, become impaired, and the individual gradually merges into a state of somnolency, from which he can scarcely be awakened; and as the tendency to indulge in this lethargy becomes insurmountable, the continued depressing effects of the cold bring on a general insensibility to all impressions, and the poor sufferer soon falls a

victim to death itself. Before the individual expires, all the symptoms are indicative of gradual exhaustion of the nervous energies, as evinced in the general insensibility, the somnolency, the low muttering delirium, the nervous tremors, and, lastly, the convulsions which terminate the scene. Of this kind of death we have many melancholy examples given by the different voyagers in the polar regions; but cases frequently occur in our own country, either from individuals being benighted, or losing their way in deep tracts of snow. In cases of shipwreck, individuals retain their vital warmth for a considerable time in the sea; for, owing to the stimulating properties of salt water, the animal heat is not so rapidly carried off as it is by fresh water: in such cases the physical powers of the system, from the exertions in swimming or otherwise, are generally tired out long before the vital heat of the body becomes exhausted.

In severe cases of frost-bite, of any exposed parts of the body, such as the ears and toes, in particular, the nervous and vascular actions of such parts are lowered to such a degree that their vital heat seems to become completely suspended. In such cases mortification or death of the part is a very common consequence, especially if warmth has been so suddenly applied as to excite too much vascular action in the surrounding parts; for, under such circumstances, the frost-bitten part, not being capable of participating in the increased heat and vascular action, is gradually thrown off as a slough or dead part. The best treatment of frost-bitten parts is to rub them with snow; for, in the course of rubbing, the snow absorbs its quantity of latent heat before it melts, after which its temperature slowly increases above the freezing point, which, together with the friction, excites a slow restoration of the vital warmth, and a gradual excitement of the nervous and vascular energies. The beneficial effects of the snow, in such cases, arise chiefly from its being both a medium of gentle friction, and from its pro-

perties in absorbing its equivalent of latent heat before it be thoroughly melted. Rubbing with the warm dry hand would be too exciting at first; but rubbing with the hand, kept constantly wetted by cold water, dropped from a sponge, would act something similar to rubbing with snow, only the water does not constitute such a good medium of gentle friction. In cases of apparent suspended animation from cold, the body should be laid in blankets at a considerable distance at first from the fire, and assiduously rubbed with melting snow, and when symptoms of restoration appear, warm cordials should be cautiously administered.

*Death from Lightning* is so very instantaneous, that the vital or nervous energy of the system seems to be at once annihilated. The whole body is left flaccid and relaxed, the vital contractility having been completely suspended; and the blood itself is also so affected, that it has lost its power of *coagulating*. Such sudden and striking changes shew that the electric fluid must have affected the whole of the system, as well *the vitality of the fluids* as that of the solids.

The celebrated John Hunter was long ridiculed for his opinions regarding "*the life of the blood;*" but this much is certain, that all animal fluids possess peculiar properties not to be found in any fluids distinct from animalization. So the opinions of that very original and ingenious surgeon and naturalist, on this subject, may be deemed correct.

It appears, then, that death from lightning is so instantaneous, that it affects at once the whole system—fluids as well as solids. The first impression of the shock will be upon the extremities of the nerves supplying the part first struck; and, if we can judge of the rapidity with which it must be sent through the whole system, by the effects of the common shock given by the electric vial, its transmission and effects must be very rapid indeed. In every probability they will be attended with little pain or appreciable sensation.

The number killed by lightning in this country is not great, but in other countries where the electrical state of the atmosphere is often changing, and consequently thunder and lightning much more common, a good many deaths occur. Cultivation of the soil seems to have a great influence in preventing thunder and lightning, for it is well known that it thunders much oftener in the wooded than in the cultivated parts of a country. So, even in this particular cause of death, civilization exerts a beneficial influence.

*Death from Poisoning.*—The dangerous and fatal effects produced upon the system by the various poisons are so very different, that we will only briefly enumerate a few of the most prominent symptoms, induced by some of the substances most commonly employed for the purpose of poisoning. However, it may be proper to mention here that the term poison can only be used in a relative sense, for all our most violent poisons can be administered as medicines, in particular and suitable cases, often with the most decided advantages. Almost every medicine possesses certain properties and produces certain effects upon the system, which, if carried to an undue extent, give rise to those morbid effects which are often found to result from the injudicious use of medicines: hence the cause of the numerous deaths, as proved by coroners' inquests, from quack medicines, and hence the very frequent occurrence of cases of bad health from the indiscriminate use of medicine by individuals themselves. All the different poisons give rise to symptoms more or less peculiar to each, for they all produce different effects upon the system.

*Leaves of Wolfsbane.*—This poison produces sense of acrid heat and numbness of the throat and lips, *nausea*, with violent vomiting and purging, vertigo, delirium, and death.

*Opium, or Laudanum*, in large doses, produces giddiness, drowsiness, stupor, and afterwards delirium, paleness

of the countenance, cold sweats, deep breathing, convulsions, apoplexy, and death.

*Sugar of Lead.*—This salt, *acetate* of lead, produces a sweet metallic taste in the mouth, constriction of the throat, inflammatory pain in the stomach and bowels, excruciating colic, vomiting (occasionally bloody), cramp, convulsions, paralysis, and death.

*Arsenic* is poisonous in a violent degree. It produces a metallic taste in the mouth, *salivation*, vomiting of brown and bloody matter, heat and violent pain of the stomach, burning thirst, constriction of the throat, difficult breathing, convulsions, and death.

*Muriate of Barytes*, when taken in large doses, produces violent retching and vomiting, severe pain in the stomach and bowels, stupor, giddiness, palsy of the legs, spasms, convulsions, and death.

*Root of Black Hellebore* is poisonous in large doses, producing vomiting, giddiness, fainting, and death.

*Prussic Acid*, when pure, is poisonous in very small quantities—a single drop put upon the tongue of a dog makes him fall down dead almost instantaneously. The common acid is poisonous in larger doses, producing stupor, *nausea*, dilated pupils, syncope or fainting, and death.

*Deadly Nightshade*, in large doses, produces constriction and dryness of the throat, giddiness, dimness of sight, dilated pupils and stupor, numbness and heaviness of the head, furious or lively delirium, laughter, redness and swelling of the face, hurried breathing, bending of the body forwards, convulsions, and death.

*Hemlock*, in large doses, produces sickness, oppressed breathing, giddiness, delirium, frenzy, stupor, dilated pupils, convulsions, and death.

*Nux Vomica*, in large doses, produces feelings similar to tipsiness, giddiness, nausea, vomiting, retching, thirst, spasm, cramps of the limbs, oppressed breathing, fainting, coma, and death.

*Corrosive Sublimate* is a very violent poison, producing at first an acrid metallic taste in the mouth, burning in the throat, usually copious salivation, despondency and anxiety of mind, violent rending pains in the stomach and bowels, nausea, vomiting and retching, fainting, convulsions, cold sweats, cramps, and death.

*Mineral Acids.*—The strong mineral acids produce burning pain in the throat and stomach, vomiting of blood, nausea, fetor of the breath, croupy cough, shuddering, hiccough, convulsions, and death.

Such is a hurried account of the symptoms induced by the most common poisons. There are many others that we might go through, but the above are sufficient to give the reader some idea of the general symptoms of poisoning.

There are some vegetable poisons, used by the savage tribes for poisoning their weapons of war, which are very deadly and rapid in their effects, and there are also many animal poisons very severe, and rapidly fatal; but into a minute description of these we need not enter, as the symptoms which they generally induce are in many respects similar to those above enumerated.

But there is one poison, namely, that produced by rabid animals, causing *hydrophobia*, which we may mention. The poison which gives rise to hydrophobia seems to originate always with dogs, cats, foxes, and wolves, that is, with the canine and feline class of animals; but the disease is often communicated from the above to other classes of animals, and also to human beings. It appears that although the bite of other animals, such as the cow and the horse, will communicate the poison to human beings, that it cannot be communicated from one human being to another. This circumstance, if correct, inclines us to think that hydrophobia in the human species is not a disease of the specific morbid nature which is attached to its name, but merely a general nervous affection produced by the poison of mad or rabid animals. When a dog becomes affected with madness he looks dull and dejected, and

shuns all society—he seldom barks, but makes a sort of discontented murmuring—he refuses food and drink, and altogether looks very listless and sleepy. At this stage of the disease he is not much inclined to bite; but he soon becomes more restless—moves a little more about, with his head and tail drooping, and bites at almost every other creature or person except his master, whom he generally respects. After these symptoms have continued for a day or two, the dog looks more furious—he begins to froth at the mouth, and pant, with his tongue hanging out—his breathing is very quick, and laboriously performed—he is unsteady in his movements, being sometimes very quick, at others very slow, but he generally goes straight forward. Under these symptoms he becomes very thin and weak—recognises no person, not even his master—gets at times into an irritable fury, and bites at every thing in his way. In a few hours his eyes look red and suffused, great depression supervenes, and he dies in a most worn out and dejected state. Now the symptoms of hydrophobia in the human being are very similar indeed.

When a person has been bit with a rabid animal, the bad symptoms do not occur for some time—the bite generally heals quickly, and with little trouble; but, perhaps, after the lapse of some weeks the part feels a little itchy and painful, and there is a sort of undescribable uneasiness throughout the system, accompanied with shifting pains, startings in the limbs, unsound sleep, disagreeable dreams, anxiety, and a disrelish for all sort of company. These symptoms go on increasing until the individual becomes very irritable, as manifested in the nervous tremors of the whole system. The person now exhibits, and complains of, great uneasiness about the throat, as if from a feeling of constriction or choking, which symptoms are accompanied with a most painful horror of water or any other fluid. Although the complaint is accompanied with great thirst, the individual dare not attempt to drink, but starts in horror at the very sight of fluids; but solids can

be swallowed with tolerable ease and freedom. Throughout the whole course of the disease there is ardent fever, as is manifested in the great heat of the whole body, the arid and rough tongue, the quick pulse, the constant restlessness, the painful thirst, and the nervous spasms. In the last stage, although all the symptoms are of the most severe character, the person is usually quite sensible ; but, as the system becomes more exhausted, the pulse gets quicker and becomes irregular, the breathing is laborious, and there is usually vomiting of greenish matter, with a copious secretion of tough saliva from the mouth. With the continuance of these painful symptoms, delirium supervenes, and the sufferer expires in the agonies of the most severe nervous spasms and convulsions.

After death various appearances have been found, such as marks of inflammation of different parts, but nothing peculiar to account for the extraordinary nature of the disease.

When hydrophobia is once established, recovery is quite hopeless. Many remedies have been tried but all without success. It appears that the cutting out or destroying of the part bitten is the only preventive of the complaint. The absorption of the poison into the system is evidently the cause of the disease, so, when the affected part is completely removed or destroyed at the very first, the probability is, that the absorption of the poison will be prevented. The part may be either cut clean out or be completely destroyed, either by strong caustic or some of the concentrated mineral acids. Of these sulphuric acid or vitriol is the best.

It is a prevailing vulgar notion that, when an individual has been bitten by a dog, he is sure to become affected with hydrophobia if the dog should at any future period *run mad*. Now, such a supposition is quite nonsensical, because hydrophobia can only be produced by the poison of a rabid animal being introduced into the system ; so, if the dog be well at the time, it may be mad next week

or even next day if it should so happen, and the individual previously bitten will be quite safe from any bad consequences whatever.

When a person is bit by a dog or any other animal of which there is any suspicion, the part ought to be immediately destroyed by some means or other. Excision is the best remedy, after which the surrounding parts may be touched with caustic or sulphuric acid.

It is allowed that bites from rabid animals are not so dangerous in the first as in the last stages of the disease; but it ought to be laid down as a general rule, that in every case where there is the slightest symptom of indisposition or unwonted irritability on the part of any animal which may have bit a person, that the requisite precautions ought to be adopted. When a dog or a cat appears prone to bite or scratch those whom it has been accustomed to regard with kindness, it ought to be avoided and narrowly watched. The following very valuable report gives an excellent illustration of the numerous deaths from poisoning throughout the different counties of England and Wales. It is copied here from the Edinburgh Medical and Surgical Journal for January 1840:—

"The total number of deaths by poison, in 1837 and 1838, was 543. Of these, 261 were females; 282 males.

"The total number of individuals poisoned by opium, or its preparations, was 186.

"The deaths of very young children (most of them at the breast) from opium, or its preparations, administered by mothers and nurses, in ignorance of the powerful effects of these substances on infants, were 52.

"The deaths of young children from opium or laudanum, administered in mistake for other medicine, were 20. In 11 of these cases, the names of the medicines are given, in the place of which opiates were given by mistake.

"*The very great number* of deaths amongst children, resulting from over-doses of opium, or its preparations, and from doses thereof given in mistake for other medicines,

cannot fail to excite attention. Deaths of this kind amount nearly to a seventh of the entire number of deaths by poison. The number was 72.

"Most of the children poisoned in this way, *lost their lives* owing to the ignorance, carelessness, or presumption of *their mothers*. It cannot be too generally known, that narcotic and anodyne drugs, powerful though they be in the adult, act with infinitely greater energy upon the more sensitive nervous system of the infant; so that even experienced medical men never administer remedies of this class to the very young, without exerting the utmost caution, and making the most accurate calculation. Two drops of laudanum have been known to kill an infant. Nay, we have heard of a case in which one drop stole away the life of a new-born babe. It is evident that the practical inference to be deduced from the facts represented in the above table is—*that mothers and nurses should never dare to administer medicines of the narcotic kind, except under the immediate direction of the medical attendant.*

"The Coroner of Nottingham states, that 'Godfrey's Cordial is given to children to a great extent; and that he has no doubt whatever, that many infants are yearly destroyed in that borough, but who, dying off gradually, never come under his notice officially.' There can be no doubt of the truth of this assertion. At all events, we can say positively that such instances occur elsewhere.

"It will be observed, that of the 20 cases in which death resulted from the administering of opium or laudanum by mistake, 11 were instances in which they were given instead of substances more or less resembling them in colour. No details of the mistakes are given in the remaining 9.

"In recording one of the 11 cases, Mr Browne, the Nottingham Coroner (who has very commendably entered more into detail than most of the other Coroners), says:—

'There appeared very great negligence on the part of the person who sold the laudanum. He had not been brought up as a druggist, but had latterly taken to the business, and employed two young girls to attend his shop and sell drugs in his absence. I ascertained personally, at the shop, that one of them sold twice as much for a penny as the other.'

"In 10 of the 11 cases, although the medicines are named instead of which laudanum was administered, we are not told whether the mistake was made by the mother, the medical attendant, or the dispenser.

"We find in the Returns 4 cases of the administration of savine and other poisonous drugs, with the view of procuring abortion. In 3 of these cases, the mother perished undelivered; in the fourth, the child perished.

"The crime of fœticide would not be so often attempted, if the real effects of savine and the other drugs made use of were properly understood. These agents never can induce abortion without placing the woman's life in the greatest danger; and a very frequent result is, that she dies undelivered, having previously suffered the intensest agony.

"In 8 cases, poison was taken for the purpose of self-destruction, by young women who had been seduced, and were pregnant. Arsenic was the poison made use of in all these instances. It is probable, that besides these 8 cases, several other of the numerous instances of poisoning by arsenic had been the result of seduction; but this is not stated in the Returns.

"The deaths of eight surgeons are entered; and it is a curious circumstance, that all of these had taken prussic acid. One had taken it with arsenic. Three committed self-destruction in consequence of pecuniary difficulties—one during the delirium of scarlet fever—one during the delirium of mania *a potu*—three during insanity. No instances of poisoning among members of the other learned

professions are stated. Perhaps this may be owing to an omission in the Returns—but we are rather inclined to consider that they are not defective on this point.

" Do not these facts furnish medical men with materials for melancholy reflection? Eight of their brethren have, within a short period, destroyed themselves; whilst no other profession is named in the tables. Three of these, indubitably, were urged to the rash act by embarrassments; and four committed suicide in insanity, which was probably induced by long-continued anxiety and disappointment. In one case only—that of insanity following scarlet fever—could different and natural causes be assigned. May not these instances of self-destruction be deemed indications of an overstocked and ill-regulated profession?

" These important Returns would furnish us with the means of extending our remarks to a much greater length, but we must, for the present at least, forbear. We cannot, however, conclude, without expressing our approval of a valuable suggestion made by Mr Frampton, Coroner for Dorsetshire. This gentleman thinks there should be some way of compelling those who sell poison, to register the day and the hour of sale, and the name of the purchaser. Mr Frampton justly observes, that, from a want of such compulsory registration, the ends of justice are frequently frustrated."

*Death from Fright and Mental Emotions.*—It has been admitted that death in many instances has occurred in consequence of violent mental emotions. When we consider the violent nervous symptoms, or fits, which are often instantaneously produced from sudden mental excitement, we can easily conceive the possibility of such shocks being in some cases so severe as either to cause almost immediate death, or to give rise to such nervous derangement as ultimately will lead to fatal organic disease. It is well known, that *bad health* very often follows bitter disappointment from consequent grief and distress,

and that individuals so circumstanced often pine away unto death. Indeed, every mental emotion of a depressing nature seems to affect the vital organism in an injurious way, and that always in proportion to the excitability of the individual. Violent outbursts of the passions are perhaps not so dangerous as their forcible repression: often do we witness the painful nervous effects of constrained passion, particularly in individuals of the bilious nervous temperament. They seem quite overpowered betwixt the mastery of all their excitable faculties. The pinched determinate expression of the countenance, the general palour, and the great agitation afterwards—all shew the forcible effects of severe mental excitement on individuals of this temperament; and such individuals are, consequently, most likely to suffer from such causes. In the sanguine, the bilious, and the lymphatic temperaments, the passions are, in general, evolved more readily, and the effects are consequently less hurtful.

According to the Report of the Registrar-General, ten deaths are ascribed to mental emotions—of these nine were females. Seven were ascribed to fright, one to grief for the death of a son, and two to a *broken heart*. In two of the cases the particular causes of death are recorded. A female, aged 63, it is said, died November 7, from trouble from the death of a son, which happened on October 30. Another female, aged 41, died on November 14, from "fright," occasioned by the sudden death of her brother, which took place on the 19th of October. In such cases, when death happens within a short period of the alleged cause, the fatal consequences are more likely to be attributed to it; but when a considerable length of time intervenes, they are more likely to be ascribed to some chronic disease. However, in all cases of the above nature, if there be any tendency in the system to any particular complaint, the probability is that such mental emotions will at least accelerate the course of the disease, and consequently the death of the individual.

# CHAPTER V.

## PART I.

On the Influence of the Constitution and Temperaments, of Habits and Circumstances in Life, and of Employments and Professions, on Health and Longevity.

*Influence of the Constitution and Temperaments on Health and Longevity.*—Every individual inherits a peculiar constitution from his parents. Parents, as has been said by the famous Dr Gregory, live again in their offspring, which is shown in the striking similarity that generally exists betwixt parents and children, and in the different individuals of families. They are like each other in their *temperament* and constitution, generally in their habits of pursuit and modes of living, and also in their intellectual endowments: they likewise inherit, and very often die of, the same diseases.

The *temperament* and *constitution* are not to be confounded with each other—the one relates to the peculiarity of the individual, whilst the other relates altogether to the vigour and development of the body. The temperaments have been usually divided into the *sanguine*, the *nervous*, the *melancholic* or *bilious*, and the *lymphatic*, each of these being characterised by certain peculiarities of the system. The *sanguine* temperament is indicated by a florid complexion, and an almost uncontrollable activity of mind, which leads to prompt action and vivid anticipations. In the *nervous*, the countenance is pale and thin; the mind, though very active, is generally too sensitive to admit of much determination of purpose. In the *bilious*, the complexion is dark, with a *hard* expression of the features; the mind, though vigorous, is often overcast

either in listless or thoughtful melancholy. The *lymphatic* temperament is characterised by a waxy flabby appearance of the whole body; the mind is generally constant and vigorous in its actions, but all corporeal exertion is performed rather sluggishly.

These individual temperaments, though often well marked, frequently run so into each other that the most predominant one is not easily known. The *sanguine* temperament is always most disposed to inflammatory affections, such as acute inflammation of the lungs, bowels, and brain, bleedings of different parts, and all kinds of inflammatory fevers. The *nervous* temperament, again, is chiefly liable to diseases more or less associated with convulsions, and other symptoms of extreme nervous susceptibility, as low nervous or typhoid fevers, hysteria, chorea, epilepsy, *hypochondriasis*, melancholy, insanity, *tic doloureux*, and other nervous complaints. The *bilious* temperament suffers from bilious derangements, as bilious vomitings and headaches, dysentery and other bowel complaints, bilious fevers, chronic eruptions of the skin, and often, from partial mental derangement, giving rise to hypochondriac symptoms and melancholy. The *lymphatic* temperament is most liable to congestions and obstructions, which give rise to diseases of the glands and joints, slow fevers, dropsies, scorbutic and scrofulous affections.

According to the Bills of Mortality for London, the number of deaths, which may be ascribed in a general way to diseases more or less peculiar to each of the temperaments, may be rated as follows :—

| Temperaments,............ | Sanguine. | Nervous. | Bilious. | Lymphatic. |
|---|---|---|---|---|
| Number of deaths noted to each, ...... | 1100 | 2064 | 1000 | 5000 |

This table tends to show that there are more deaths in London from those diseases to which the lymphatic temperament is more peculiarly liable, than from all the others

put together; and from this the following question naturally suggests itself:—Is there any difference of the *expectation* or value of life in the different temperaments?

The above numerical statements cannot be taken as a criterion at all for estimating the comparative value of life in the different temperaments, because the proportion of deaths, as marked above, will depend *chiefly* on the relative numbers of individuals to each of the temperaments in society at large; but it indicates the general nature of the diseases which most of the people of London die of, and at the sametime the temperaments which prevail most. Now, if correct tables could be got up, showing the average number of years attained by any given number of individuals in each of the different temperaments, conclusions might be drawn as to the comparative value of life in each. The probability is that there may be a considerable difference, but we cannot do more than merely hazard the opinion, as we have no statistical data to go upon. If the requisite tables could be got up, the investigation might bring about important changes in our life assurances.

Besides these different temperaments in individuals of the same kingdom or country, there also exists *national temperaments.* This is well illustrated in the differences of the English, Scotch, and Irish.

Mr Alcock, in his *Medical History of the British Legion in Spain*, says—"The English were upon the whole a bad class as to physical capacity. The same observation applies to the Scotch, who were chiefly from the manufacturing towns. The Irish were undoubtedly, of all the Legion, the men who were physically and morally the best adapted for the service. It often seemed to me that both English and Scotch were quite capable of growing thin, miserable, and sick, upon the moody anticipation of evils and privations, while the reality itself seldom broke down the Irishman, and never until it produced actual disease. * * One-third nearly

of the English brigade of infantry was swept into the hospitals with great rapidity ; the Scotch next, about one-fifth, and the Irish in a comparatively moderate proportion, probably not more than one-eighth." These observations of Mr A. are quite in accordance with what we have all observed in regard to the three national characters, and such is really the case in many respects regarding the differences of other nations.

The *constitution,* as we mentioned above, is very different from the temperaments. An individual of any temperament may have a good and sound constitution, for a sound body depends entirely on the due proportion and adaptation of all its parts, as also on the proper performance of its functions. The vigour of the system may be estimated from its external appearances, which are a pretty sure criterion of its general soundness. But many a person appears healthy and strong who has within him the incipient germs of a fatal disease, ready to spring up with the first exciting cause. Such diseases are considered constitutional, and are often hereditary, running for generations through whole families: yet there are many individuals who, though possessing a well-marked family predisposition to certain diseases, live to a good old age without being afflicted with any hereditary complaints whatever. Such an exemption can only be the effect of a well-balanced body, acting in unison with all those natural influences which are most conducive to the proper performance of the various organic, and animal, functions.

If an individual arrive at maturity without having had any severe local disease—that is, any disease which has not left some bad constitutional effects—it may be allowed that he has a sound body, and has an average chance to live to an advanced age. Now, we find individuals so circumstanced of every temperament. There is, therefore, no temperament incompatible with a sound constitution. So the general inference is, that, in the most of cases, *premature* death must arise from some infringe-

ment of the natural laws; for few are born with actual disease, but of course all are more or less susceptible of its exciting causes.

*Influence of Habits and Circumstances in Life on Health and Longevity.*—When worldly comforts are enjoyed with discretion, and with due regulation of the mind, a middle state in life must afford the greatest chance of long life and exemption from disease. Daily observation convinces us that disease is most prevalent amongst the poor, the ill fed, and the ill clothed: the reason of which is very obvious—when individuals are not properly fed the energies of life flag, all the bodily powers become weakened for want of sufficient nourishment; so a system enfeebled from want can neither be so able to resist the exciting causes, nor the effects of disease. The diseases most prevalent amongst the poor are, constitutional debility, low typhoid fevers, bowel complaints, scorbutic and scrofulous affections.

The middle classes are the most healthy, for they are neither exposed to severe privations from poverty, nor to the hurtful excesses of affluence. Whilst they are thus exempted from the low *adynamic* complaints of the poor, they at the sametime avoid the direful consequences of high living which pretty generally follow the rich. The different forms of dyspepsia, gout, apoplexy, and paralysis, are not so common, comparatively speaking, amongst the middle classes as they are amongst the higher. All these diseases are generally the consequence of an improper system of living, as affecting all classes; and nothing is more conducive to their development than a constant use of fermented and spirituous liquors, accompanied with close confinement, late hours, ease, and idleness.

We need scarcely state, that nothing is more conducive to long life and health than proper nourishment. When any of the domestic animals are put upon improper food, the effects become very soon apparent in the particular manifestations both of their spirit and of their external

appearances. Such is precisely the case with human beings. When man is nourished with a due quantity of animal and vegetable food, he is generally vigorous and healthy; and if he has exercise sufficient for the employment of all his faculties, both mental and corporeal, he is likely to continue so for a while. But when he begins to deviate from the proper course of living, either from caprice, or from necessity perhaps, the effects very soon become apparent, according to the effects produced upon the system at large. If he should cease from taking his accustomed quantity of nourishing food, and still endeavour to perform his usual quantity of labour, his bodily powers will gradually become impaired, and he will ultimately feel quite unable for the exertion; perhaps he may become affected with a serious malady, such as rupture of a large blood-vessel, inflammation, congestion, or some other consecutive bad effects. Such are frequently the consequences of over exertion upon a reduced body; the vital resistance being too much weakened to withstand the effects of continued bodily exercise. Again, when the system is highly nourished, without sufficient exercise being taken, its nutritive functions become too strong for its vital action of resistance; hence the origin of many diseases of the heart and vascular system, which lead to dropsy, apoplexy, and numerous other fatal diseases, arising from an exuberant and unhealthy state of the system.

Errors in diet form a long catalogue of the causes of disease, but we can do little more than merely allude to the subject. There cannot be a more common source of disease than this, for every thing which we eat or drink must either be conducive to our health or not. When we reflect on the simple nature of food allotted to us by Nature, and again consider the various changes and combinations which that undergoes in the different processes of cookery, we need not feel surprised at the numerous affections produced by such frequent, and at the sametime such cogent causes. Indeed, the whole of our *very refined*

cookery may be termed a bane of human existence. But the bad effects are not to be so generally attributed to the combination of the articles of food, as to the pernicious habits which they are calculated to engender—the partaking of too much out of too many dishes at one diet. Every different article of diet is peculiar in its properties of digestion; so, when a great many are taken together, that function cannot be in harmonious action with them all; hence the origin of bad digestion and all the train of evils which follow. By such a practice the stomach is overloaded beyond the capability of healthy digestion; the food passes through the bowels in a half-digested and crude state, from which result congestion and irritation of different parts of the intestinal tube, giving rise to *hemorrhoids*, obstructions, swelling of the glands, and many other serious complaints: and with all this food the body is not properly nourished; for, from the food not being sufficiently digested, and from the irritable state in which the system is kept, its nutritive properties are entirely lost. Some individuals, however, are not easily hurt in this respect. When a capacious and powerful stomach is set in a vigorous body, and when great quantities, even of different kinds, of food are daily taken, the stomach generally acquires a capacity and adaptation to the charge, and may come to perform its functions pretty well; but what is the result? a great overgrown unhealthy body, liable to all the serious diseases of gross corpulence. Such is merely a hint on the effects of improper living, for a whole volume might be appropriated to a complete consideration of the subject.

From the remotest times, early rising has been considered very conducive to health and long life—which is really a fact confirmed by observation, for individuals who have attained to a great age have almost invariably been early risers. This circumstance is quite in accordance with the established principles of the animal economy. As the day advances, the vital powers of the system begin

to decline; and toward the natural time for going to sleep, they perhaps have sunk to their *minimum* degree. About *four* in the morning the vital powers begin again to increase, and arrive at their *maximum* about noon. These data have been deduced from the experiments of Dr Prout, in ascertaining the quantity of carbonic acid gas excreted from the lungs at different times of the day; for it appears, that, in proportion to the quantity of this gas thrown off, is the action of the vital powers increased. So every person should commence his labours by four or five in the morning, and have done by one or two in the afternoon. Such should be the case—but alas! how few walk up to this natural division of time! Worldly customs render it almost impossible; so health is sacrificed at the shrine of pernicious and unproductive habits. Late hours of going to bed, late dinners, and late rising, are three very insidious underminers of health, and consequently tend very much to shorten the span of human existence.

The rage in this country at the present time for early mental acquirements, is certainly the cause of much disease and premature death amongst the young. From four to seven years of age, all the organic and animal functions are in very active operation in bringing the system to mature childhood; and as the general development of the body advances, so does that of the mind; for, about the age of seven, the brain has acquired almost its full size, and has become comparatively large and firm, and consequently fit for the performance of its proper functions. The brain has thus been growing much more rapidly than any other part, because of its constant excitement from the various mental impressions which never cease to stimulate the youthful mind. As our first mental acquirements are derived from discernment of external nature, and as they are purely acquired from the natural operation of the perceptive faculties, their excitement may be considered as the only healthy mental stimulus in infancy or childhood. Every object presented to children is examined

with a curiosity proportionate to its novelty and the interest which it excites. The child examines, looks, and wonders; it begins to compare different things with each other, and thus brings itself into some acquaintance with the different objects which may come under its observation. But how often is this natural course of learning checked in children! Before a child has acquired a development of body capable of bearing the fatigues of education, it is sent to school to learn and labour at tasks quite above both its bodily and mental abilities. Such a system, practised during the dawn of observation, destroys all the natural mental associations, and renders children stupid, obstinate, and peevish regarding everything else. They have no thoughts beyond the gloomy reflections of *constraint and school;* their body is not developed to its years; and too often they fall a sacrifice to serious diseases, arising from a broken-down constitution.

Such manifestations ought to point out the proper system of education which should be adopted in childhood. No child should be confined to a reading school till between six and seven years of age, for not till then are they capable of being benefited by that kind of learning. Till the age of six, at least, a child's education ought to be strictly on the *infant system*, but perhaps with fewer restrictions and with less methodical drilling than is generally practised in infant schools; for children are never more vigorous, either in mind or body, than when left chiefly to their own resources for amusement. Children will never suffer from being instructed, and from having their curiosity gratified, regarding those things which their own faculties prompt to, if they be allowed to take as much wilful exercise as is consistent whith their age and strength of constitution.

It is also a serious error to force advanced children to the acquirement of particular branches of education against their determined will, and consequently against their capacities for acquiring them. Under such circumstances,

children grow careless and profligate of their time—leaving school *heart-broken* and dejected, and very frequently much hurt in their bodily health.

It is during the age of childhood that the greatest attention ought to be paid to mental manifestations—that the effects of education upon the *cerebral* system ought to be narrowly watched; for how many melancholy cases of premature death amongst the young do we observe from different affections of the brain; and all the direful effects of scrofula are too often the result of a broken constitution, from over confinement and constraint.

Our present system of boarding-school education is a most flagrant destruction to the health and comforts of that portion of the female race who have the misfortune to be bound down to the rules of those establishments. Not one dare act according to her own natural feelings—she must eat what is set before her whether it agree with her appetite and taste or not—she must only sleep a certain time whether she be refreshed or not—she must walk a certain length, and at a certain hour, whether she be able and willing for it or not—she must sit in certain positions whether the natural conformation of her body tend to these or not. In short, she must act up to the rules of the establishment whether she die or not! From such an unnatural system of education many young ladies return to their mother's home, "improved and altered in their manner" no doubt, but bearing all the evident marks of a broken down constitution. Such discipline too often brings on consumption, curvatures of the spine, and many other complaints, which end fatally. According to Dr Farr, for 100 males who die of consumption there are 108 females. The proportion given by M. Benoiston is still higher: of 1554 deaths from consumption of the lungs, which occurred in four of the principal hospitals in Paris, 745 were men, and 809 women; but, in the whole of the admissions into those hospitals, the proportion of consumptive cases was as 28.5 per thousand for men, whilst it was 47.5 per thou-

sand for women. M. Louis states, "that for every seventy deaths (from consumption?) among men in the Parisian Hospitals, there are ninety-two among women."*

The general habit of dressing in this country is certainly not at all adapted to the changeable nature of the climate. In the greater part of Britain and Ireland the vicissitudes of the atmosphere are very frequent and sudden. Even during summer we have generally very chilling breezes, which set in in the evening and continue till late in the morning. Such changes are more or less trying to the constitution in proportion to the extreme variations in the temperature of the atmosphere, to the quantity of moisture it contains, and likewise according to the manner in which the body is protected by clothing.

Hitherto the wearing of flannel next the skin has been very much neglected in this country, and especially by those whose occupations do not require it as a means to absorb the perspiration. But even the great majority of working people have also entirely overlooked its advantages in this most important respect. The skin is one of the most important, and, at the same time, one of the most extensive organs of the body; it both serves as an entire covering, and as an outlet to a very abundant secretion—the insensible transpiration and the perspiration. According to the experiments of *Lavoisier*, in some individuals not less than six pounds of *insensible* transpiration passes off by the skin and lungs per day. As about two-thirds of this quantity is exhaled from the skin itself, we can easily conceive the injurious effects of any stoppage or alteration of this secretion. Now, the skin and lungs are the two organs in the most mutual sympathy; so whatever affects the one must materially affect the other. When the transpiration from the skin is checked, too much fluid is thrown upon the other excretory organs, which may be either to the lungs, bowels, or kidneys, according to

* Edin. Med. Journal. Annales d'Hygiene, 1831.

the predisposition of the individual. When thrown upon the lungs they become engorged, and consequently impeded in their functions, from which may result acute inflammatory action within the chest, affecting either the lungs, the *pleura*, or the heart, just according to the different consecutive effects produced. Such is the common *exciting* cause of pulmonary consumption, the different kinds of *asthma*, and of many incurable affections of the heart. Again, when the determination takes place to the bowels and kidneys, we have often the most serious effects from the different diseases to which these organs are peculiarly liable. When the determination has been more general, affecting at once, as it were, the whole vital organism of the body, we have different kinds of continued fevers, assuming different types, according to locality, to the temperature and moisture of the atmosphere, and to the general state or habit of the individual.

The wearing of flannel is certainly the best preventive against the influence of atmospherical changes in checking the transpiration, for it combines or possesses two very marked properties to this effect. 1st, It is a bad conductor of heat, consequently it preserves the natural temperature of the skin, and favours the transpiration. 2d, It absorbs the moisture, and, from its not carrying off the heat at the sametime, prevents the body from being cooled down by a rapid evaporation. Indeed, so important does the use of flannel seem to be in this our variable climate, that, if it were generally worn next the skin, it would be the means of warding off much disease; and consequently, of enhancing greatly the value of life. If the young of our island were reared in light flannel under-dresses, there would be a vast decrease in the number of *premature* deaths arising from the ravages of *phthisis* or consumption of the lungs, and scrofula. But too abundant clothing is often a fertile source of disease, for it overloads and tires out the body, by keeping it always in over excitement; which is particularly the case

with individuals who labour in warm and close apartments. So, when an individual is too heavily clothed, and undergoing heavy bodily labour at the sametime, every part of the system is excited to an undue degree, the animal heat is very much increased, the action of the heart and lungs is much quicker—indeed, all the machinery is working above par. Under such circumstances the vital energies are becoming rapidly exhausted, and if the individual should become affected from exposure to cold, or from any other exciting cause, he is likely to suffer more severely than he otherwise would have done. Comfortable warm under-dress is certainly one of the most powerful preventives against inflammatory complaints; but an over-quantity should invariably be avoided, for the body, when over-clad, becomes relaxed in its vital tone, and consequently becomes more susceptible of different impressions; especially of those which affect the lungs and bowels.

The *mode* of dressing has also a very marked influence in engendering many diseases. The fair portion of our race are the chief sufferers from this cause. Females are very liable to chest affections, from the dress being generally worn either too thin or too low over the bust; and children, in particular, frequently suffer from the same cause, being often taken with croup, and many other severe catarrhal complaints, from too much exposure of the neck and upper part of the chest. But the most pernicious practice in female dressing is the very tight lacing of the stays, a practice most injurious in many respects. From tight compression of the chest, the motions of the lungs and heart are greatly impeded; and so much are the functions of the stomach, liver, and bowels impaired, that they are seldom regularly performed. The natural formation of the chest is a very nice adaptation for its intended functions; but, when compressed by firm stays, it acquires a different shape altogether. Instead of being broad and expanded from side to side, it becomes much contracted in these directions, whilst it acquires greater capacity

from before backwards; so what is lost in one direction is partly made up for in another. But still, stays, embracing the whole chest tightly, tie down the motions of the ribs, consequently the chest is deprived of that freedom of motion and resilience necessary for free breathing. Again, this binding of the chest causes its contents to descend more or less toward the abdomen, and, therefore, encroaches on the capacity of it; which frequently gives rise to bad digestion, congestions of the liver, and almost invariably to irregular action of the bowels. From too tight lacing in early life there often arises relaxation with curvature of the spine, followed by long continued weakness, which very frequently ends either in pulmonary consumption, abdominal marasmus, or lumber abscess, terminations which always prove fatal in the long continued hectic fever which they generally induce. "The higher mortality of English women from consumption may be ascribed (says Dr Farr) partly to the in-door life which they lead, and partly to the *compression*, preventing the expansion of the chest, by costume. In both ways they are deprived of free draughts of vital air, and the altered blood deposits tuberculous matter with a fatal unnatural facility: 31,900 English women died in one year of this incurable malady? Will not this impressive fact induce persons of rank and influence to set their countrywomen right in the article of dress, and lead them to abandon a practice which disfigures the body, strangles the chest, produces nervous or other disorders, and has an unquestionable tendency to implant an incurable hectic malady in the frame? Girls have no more need of artificial bones and bandages than boys."

Indolent habits, and too great exertion, are both very prevalent sources of disease. Those who take little exercise and live well, are generally victims of chronic diseases of the congestive kind—as gout, congestions of the liver and bowels, apoplexy, and different affections of the kidneys. Those, again, employed in sedentary occu-

pations are liable to many affections which arise from diminished vital power, in consequence of the nervous and vascular systems losing their proper tone. Confinement, with little exercise, usually gives rise to *dyspepsia* in all its varieties, *hypochondriasis*, *hysteria*, *neuralgia*, and many other nervous complaints. Too much exertion always fatigues and weakens the vital powers; whilst moderate exercise, especially in the open air, rouses all the animal spirits, and consequently invigorates both mind and body. Very serious complaints often arise from violent exercise. Not to speak of those which result directly from accidents, we may have rupture of different blood-vessels, giving rise to spitting and vomiting of blood, and sometimes even to apoplexy itself. Over-fatigue always favours the impressions of those exciting causes which give rise to fevers, inflammations, and all the different bowel complaints.

*Circumstances in Life* are much modified by the influence of worldly pursuits. Perhaps the respective pursuits of the active and temperate country gentleman, and of his well-living peasants, may be classed under the same head as to their general influence in promoting health; for all due exertion or exercise in the open air seems to be almost alike conducive to the health of man.

The town's gentlemen, and their artizans, are very differently situated—the former have it in their power, in a great measure, to employ their time in a way conducive to their general health, but the latter are tied down to their restricted hours and labour, and are generally confined in close apartments, besides being subjected to all the unhealthy influences of their employment.

It may be broadly asserted, that good circumstances in life, *ceteris paribus*, are most conducive to health and longevity, an assumption that is well established from the observations which have been made upon the lives of those insured at the different insurance offices; for as insurances on lives are generally effected by those

in easy circumstances, the statements may be taken as positive proofs of the comparative value of life in the better, and in the working, classes of society respectively.

At the present time the average annual mortality of Great Britain is about 1 death to every 45 inhabitants. Now, the rate of mortality "*amongst persons insured at the Equitable, from* 1800 *to* 1820, *was only about* 1 *in* 81½," which is a great difference for "*picked lives.*" "Of a thousand members of the University Club only 35 died in 3 years, which is a still lower rate, about 1 in 90 annually. Of 10,000 pupils who passed through Pestalozzi's institution, in Switzerland, it is even asserted that not one died during his residence there. These were youths chiefly, but of all countries, constitutions, and ages, it is to be observed of easy circumstances. Pestalozzi also paid particular attention to their bodily exercises."*

However, in estimating the value of life in easy circumstances from the above statements, the proportional mortality of different ages must be taken into account. Life insurances are generally effected on individuals of mature years, a time when the proportional mortality is small. Pestalozzi's pupils would be all past the most fatal period of childhood or youth.

According to the researches of *M. Benoiston de Chateauneuf*, the rate of mortality amongst the poor is much higher than amongst the rich. He estimates "the mortality per cent. among the rich and poor as follows :—

| Age. | Rich. | Poor. |
|---|---|---|
| "From 25 to 40 years………… | 2.05 | 5.50 |
| 40 to 50 years………… | 2.44 | 4.26 |
| 50 to 60 years………… | 3.49 | 7.18 |
| 60 to 70 years………… | 7.37 | 15.01 |
| 70 to 80 years………… | 14.89 | 28.73 |
| 80 to 90 years………… | 27.87 | 0.00 |

"It has been calculated that in Paris there does not

* Hawkins' Medical Statistics.

survive one pauper person beyond 80 years of age; whereas, among the richer classes, there are not a few octogenarians."

Our author sums up his remarks with the following conclusions:—

"1. That poverty exercises a directly injurious influence on the duration of life.

"2. That at least 28 per cent. among the poor die from this cause before the fifth year of life, and even more than this proportion where fecundity exists among a population.

"3. That, however, when all other circumstances are alike, there is rather smaller mortality among the poor than among the rich between the 20th and the 30th year of life.*

"Lastly, That fewer die from poverty in an agricultural than in a manufacturing population."†

To illustrate the wonderful influence which proper living, good treatment, and civilization have in diminishing mortality, I will make another quotation from Dr Hawkins' work:—"It was formerly computed that a fifth or sixth part of negro slaves died annually. The free Africans, who serve in our troops, have been said to lose annually only 3 men out of 100, while the slaves were losing 17 in 100 (nearly six times the number!) At present, however, their mortality decreases in proportion to the superior care taken of them: of about 20,000 landed at Rio Janeiro in 1823, only 1400 died on the voyage; which would still form an enormous proportion for Europeans, but is a happy contrast to the former returns of a slave-ship."

This is a particular illustration of the good effects of care and proper treatment, in preserving health, and in

* "Our author attributes this somewhat unexpected result of his inquiries to the pernicious effects which flow from the facilities which the rich have of gratifying their passions, during the epoch when these are most vehement."

† Medico.-Chir. Review, April 1840; Bulletin Medical Belge.

diminishing mortality; and if similar observations could be made regarding the general masses of the people, there is not the slightest doubt that they would be attended with similar results. Indeed, every day occurrences convince us of the great proportional mortality amongst the poor, compared with that of the rich, from epidemic diseases; and it is well known by medical men, that individuals, who are hard wrought, ill fed, and ill clothed, seldom stand disease well, it being always apt to assume the typhoid type in such subjects.

*Influence of Employments and Professions on Health and Longevity.*—Every profession or employment produces certain effects upon the system, more or less influential in bringing about changes which often lead to actual disease, and consequently to death itself. Mr Thackrah, of our own country, and some very eminent continental physicians, have written rather extensively on this important subject, but we can only give a very brief view of their researches. In order to make the subject as clear as possible, we will adopt the classification of Ramazzini, one of the continental writers.

According to the above distinguished author, the first class embraces those causes which operate in deranging the system generally, from their debilitating effects. These are, *confinement*, *inadequate ventilation*, *sedentary habits*, and *over-exertion*. The second class comprises those causes which take effect by deranging more particularly some individual part or parts of the body, which soon affects the whole system. These are, *too much exertion of some parts, with too little of others*, *constrained positions*, *temperature*, and *moisture*. The third class consists of those causes which act either in a mechanical or chemical way upon the different vital organs, deranging their functions either from the direct irritation produced upon the affected part, or from their effects upon the body at large, through the medium of the nervous and absorbent systems. The causes acting thus are the minute particles of *mine-*

*ral, animal,* and *vegetable* substances. Each of these causes we will now consider in the order of the above classification.

Class 1.—*Confinement and Insufficient Ventilation.*—The weakening effects of confinement and insufficient ventilation are very apparent on the great majority of weavers, tailors, mantuamakers, and milliners, and indeed on almost all the people employed in large factories, but particularly in the cotton-spinning department.

In the cotton-factories the temperature ranges from 75 to 90; and, although the apartments are usually very large, they are very ill ventilated. There are no currents of air either to fire-places or from the windows, the apartments being heated from the passing of steam or heated air through metallic pipes. Under such circumstances there must always be a great contamination of the atmosphere, from the accumulation of animal effluvia and carbonic acid gas constantly arising from the bodies of the workers.

Owing to the long hours and close confinement attendant on factory labour, a question has arisen whether or not this system be the means of shortening life. That constant confinement for 12 or 14 hours in a close heated apartment is prejudicial to health no one will deny; but although the factory system on this account may be conducive to bringing on general weakness of the system, we are inclined to think that it does not predispose to any particular fatal diseases, as is the case in many other employments. Few cotton-spinners are employed after the age of forty-five, for by that time they are unable to keep pace with those younger in the employ. At this early age the most of them are much broken down, being generally very thin and much older like than their years. This premature decay undoubtedly arises chiefly from the active labour and close confinement attendant on cotton-spinning; but it should not be disguised that it is greatly accelerated and increased by the intemperate habits of the spinners themselves; for, although they are generally a very intel-

ligent class of men, they are often very negligent in respect to that conduct which would greatly improve their health and increase their term of life. And the piecers, and other young people employed in these factories, seem to suffer as much from insufficient clothing, improper food, and miserable homes, as from the confinement and exertion necessary in their employment. The writer has often observed that, although the young people employed in factories are generally very thin and pale, those who are properly fed, housed, and clothed, are usually pretty healthy, and seem to be more exempted from prevailing diseases, particularly those of an inflammatory nature, than almost any other class of children. However, no considerations whatever would lead us to encourage the very early employment of children in factory labour, nor that they should be employed more than eight or ten hours per day, with an allowance of an hour or *an hour and a half* to each meal. Under such arrangements the factory children, with proper living, might be as healthy and long lived as any others. But it is preposterous to think that the vital powers of children, say under eight years of age, can withstand twelve or thirteen hours' labour in a confined and heated apartment, and under the miserable living which they are so often subjected to, from the cupidity of profligate and unprincipled parents.

The most of the workers in the cotton-factories advanced in life are subject to stomachic and biliary derangements, and different kinds of bowel complaints; but they do not seem particularly liable, as we have already hinted, to any fatal diseases which can be strictly attributed to the employment.

That factory labour is not very prejudicial to the health, even amongst the young, is fully proved by the investigations of the Royal Commissioners. About 1000 factory boys and girls, taken from different places, were weighed and measured with other children, of the same age and of both sexes, not employed in factories, and it

was found that they differed very little either in respect to size or weight. " The average weight of a number of the boys and girls employed in the factories, between the age of nine and seventeen, was for the former 75.175 lbs., and for the latter 74.739; the average weight of an equal number of the same age not employed in factories was for the boys 78.680, the girls 75.049. The average stature in inches of a number of factory boys and girls was respectively 55.282 and 54.951, while the average stature of an equal number of non-factory children at the same ages was respectively 55.563 and 54.971. The non-factory boys were thus the heavier by less than a twentieth, and taller by about a hundredth, while the factory and non-factory girls were almost identical in both size and weight. Perhaps more extensive inquiries are wanting to give complete satisfaction on this question; but, in the meantime, enough has been done to show that the outcry as to the effects of factory labour in stunting the human frame in youth is founded on pure surmise, and not worthy of being listened to for a moment."*

According to Dr Johns of Manchester, the mortality of the district of Ancoats, which is the chief seat of the cotton-factories, is greatest in proportion to that of the other districts in the first five years of life, and in advanced life, above 57 years of age. His statements are quoted as follows:—

" Thus, it appears that in the five Registrars' districts in Manchester, viz., Ancoats, the chief seat of the cotton-mills, St George's, containing a large portion of Irish, Deansgate, London Road, and Market Street, the last three constituting the more ancient and principal part of the town, the number of deaths under five years is greatest in Ancoats and fewest in Market Street. In the first year it was 60 per cent. in the former, and 32½ in the latter, the

* Figures of Arithmetic *versus* Figures of Speech.—*Chambers' Edinburgh Journal, May* 4, 1839.

difference being 27½ per cent. From above five and under twenty-six the deaths were more numerous in Market Street, and fewer in Ancoats by a difference of nearly 5½ per cent. Above 25, and under 51, the deaths in Ancoats are nearly 15 per cent., and in Market Street 29 per cent. Above 70, in Ancoats and Market Street, the deaths are as 10 to 16. The second year was still more fatal to young children; for, while the proportions remain nearly alike, the deaths under 5 years, in Ancoats, amounted to 65 per cent., in Market Street 41 per cent., and from 26 to 70, Ancoats 20 1-third, and Market Street 39½ per cent."

From these statements, then, it appears that the factory system does not increase the proportional mortality of those ages mostly engaged in it, namely, up to 51 years of age. But it will be observed, that, in Ancoats, both in early and advanced life, the rate per cent. of mortality is much higher than in the other districts. Dr Johns attributes the greater mortality in infancy in the factory district, to the practice of mothers giving out their infants to be nursed, so that they may be enabled to find employment in the factories for themselves; likewise to their continuing too long at work when *enciente.* The greater mortality in advanced life, again, is evidently owing to the broken down state of the system from continued close confinement and labour, and very much from the intemperate and careless habits of the people themselves.

Weavers and tailors suffer very much from close confinement and insufficient ventilation. The damp, unwholesome, ill-smelled shops of the former give rise to bad digestion and suppression of the cutaneous transpiration; from these result general derangement of the system, as manifested in thinness of the whole body, in dropsical swellings of the legs, dyspepsia, and a depraved state of the fluids generally. A good many young people employed at weaving die from consumption of the lungs, and they seldom make good recoveries from long-continued fevers. Tailors are generally

very thin in body, martyrs to stomach complaints, and derangements of the digestive organs; they are likewise very liable to chest affections, particularly to *bronchial* consumption, which is always accompanied with very copious expectoration. The emaciation and general unhealthiness of this class of workmen arise chiefly from the close confinement and insufficient ventilation which exist in large shops, along with the constant unwholesome fumes arising from the heated irons in pressing. Tailors are frequently very irregular in their hours of working, and they are also often irregular in their way of living, being generally rather dissipated; which evils are great sources of their general unhealthiness. Mantua-makers and milliners are a class of individuals whose condition is, almost beyond that of all others, the least enviable; their labour is irksome in the extreme; their anxiety is proportionate to their desire to please finical and troublesome customers; they are close confined from early in the morning till late at night; they have little appetite beyond a desire for tea or any other light and stimulating beverage; their hours of rest being often encroached upon by unreasonable demands, they do not enjoy a sufficient amount of sleep. All these pernicious influences tend to undermine the health of this class of individuals, and they consequently suffer from numerous diseases, all more or less traceable to their wearing-out occupations.

*Sedentary Habits* are generally prejudicial to health, from the great relaxation of the system which they induce. There are numerous occupations which may be classed under the present head. Close literary pursuits give little exercise to the body but an over-exertion to the mind. Literary men usually suffer very much from dyspepsia and headache, with many painful nervous affections; and they very often die of consumption, or other diseases of the chest. When literary men are taken with severe disease, as fever, it is very apt to end in determination to the

brain; which arises from the great activity of that organ in individuals engaged in mental occupations. Clerks, jewellers, watchmakers, engravers, weavers, tailors, shoemakers, mantuamakers, working milliners, and corsetmakers, all suffer very much from confinement, constrained positions, and the bending of their bodies forward, all of which give rise to numerous diseases of the chest and bowels. Tailors are particularly liable to dyspepsia, headaches, giddiness, curvature of the spine, piles, fistula, and bowel complaints; shoemakers are very liable to scrofulous affections, and consumption of the lungs; milliners to diseases of the spine; and mantuamakers to dyspepsia and other chronic complaints.

Class 2.—*Over Exertion* weakens the vital powers, and consequently disposes the whole system to take on disease. Indeed, over exertion, with insufficient nourishment, shortens life in some employments very much. Miners, colliers, coalheavers, firemen, *gabert*-navigators, ditchers, sawers, ironsmelters, moulders, smiths, and labourers are generally short-lived. Their constant and severe bodily exertion weakens the vital powers, and their intemperate habits, engendered by over-fatigue, cannot fail in exciting many diseases in a system previously worn out by hard and protracted labour. Individuals in the above class generally die from *chronic bronchitis*, or *bronchial* consumption of the lungs, which may be accompanied with other diseases, more or less connected with the *particular bias* of the employment. They are short-lived, being in general old men at from forty-five to fifty years of age.

*Undue Exertion*, or too much exertion of some parts with too little of others, is also a very common cause of many fatal diseases. Those accustomed to carry heavy loads, in a way peculiar to their occupation, generally suffer more or less in some particular part of their body. Millers, porters, coalheavers, bakers, draymen, and glass-blowers, are liable to serious affections arising from

ruptures of blood-vessels, and of other important parts, as is often manifested in those alarming symptoms arising from spitting and vomiting of blood, different kinds of *hernia*, &c.

*Constrained Positions* have a very marked effect in altering the natural bearing of the body, and likewise in bringing on many diseases. Indeed, the former is so very generally the case, that almost every individual is characterized by his occupation. Shoemakers are in-kneed, flat-chested, out in the back, small in the legs, and are subject to spinal complaints, abscesses, and chest affections; tailors are rather *in* in the back, *out* and *forward* in the knees, *high* in the shoulders, and are particularly liable to *fistula*; draymen and porters have expanded chests and shoulders, they lean a little forward, and are subject to *hernia*, and spitting and vomiting of blood; colliers are *straight* in the back, high in the shoulders, strong in the arms, bent forward in the knees, and are very subject to muscular *pains* and *asthma*; bakers are straight in the back, strong in the arms, but generally weak in the legs, and are subject to swellings about the neck, varicase veins, and *hernia;* glass-blowers are emaciated all over, soon get *broken-winded*, and generally die of *asthma* and debility at an early age. Such are some of the effects of *undue exertion*, and *constrained positions;* and, trifling as they may appear to the casual observer, they are nevertheless very fertile causes of disease and premature death.

*Temperature and Moisture* have a particular influence over the animal economy under all circumstances, but their vicissitudes in different employments have a very great influence in bringing on many diseases. Those employed in close warm apartments, such as cotton-spinners, only suffer *in a general way* from the debilitating effects of heat; but those who require to shift frequently from a warm to a colder atmosphere suffer in a way peculiar to their respective employments and predisposition of their bodies. Smiths and moulders are continually running from their

forges and furnaces into a colder atmosphere; and, being generally perspiring very much, have the perspiration often checked, which renders them very liable to inflammatory attacks, catarrhs, and rheumatism. Glass-blowers, brewers, and bakers, also suffer very much in the same respect, and are particularly liable to catarrhs, which too often end in *bronchitis* and inflammation of the lungs; which is often followed by different kinds of *asthma* and bronchial consumption. Cooks are seldom healthy, though they generally look well and are fat, being very subject to dyspepsia, catarrh, and *asthma;* and they very often die from dropsy, brought on by the influence of these diseases on an over-nourished and relaxed habit of body.

*Moisture* invariably depresses the vital powers, and that in proportion to the length of time it is applied. If electricity be, as is supposed, the prime vital mover of the animal functions, then the circumstance is easily explained by the fact, that electricity is rapidly carried off from any body by moisture. The immediate effect of moisture upon the system is to lower the animal temperature, acting as a sedative on the nervous system, and thus diminishing the whole vascular action. This is more particularly the case when a person gets wetted from rain, or in any other way, and is obliged to remain in wet clothes. Under such circumstances there is a constant evaporation kept up, with a corresponding diminution of animal heat. The effect is very different when a person plunges into water, and remains even for a considerable time. Complete submersion reduces the animal heat as cold directly applied, but it does not produce the great sensation of cold caused by evaporation—the temperature of the skin being only reduced, whilst that of the internal parts is little affected. So moisture acts only injuriously upon the system when there is great cold produced from its rapid evaporation. When a hard working man is exposed, for the most of the day, to wet and cold, there must be a very great evaporation from his body, and, consequently, an increasing reduction of

temperature; but his hard labour increases the circulation, which keeps up the *animal* heat, and prevents the temperature from falling below a medium degree: so here we have two depressing causes operating at one time—moisture carrying off the vital heat, and hard labour tiring out the energies of the system. Such being the case, gardeners, ditchers, sailors, fishermen, coalheavers, quarrymen, and miners, though usually very robust looking, are generally not vigorous in constitution, for they seldom stand severe disease well; it being apt, as we said before, in such subjects, to take on a typhoid type, or to end in a broken-down constitution. Besides suffering thus, in a general way, from the depressing influences of wet, they also suffer much from rheumatism, catarrh, *asthma*, and bowel complaints. Ploughmen, though generally strong built men, are seldom fit for work beyond fifty; indeed, the most of them are done at forty-five, so injurious are the effects of sudden transitions in temperature and moisture even upon a class of men breathing the best of air, and usually living in a very sober manner, and upon good wholesome diet. But it must be allowed that few agricultural labourers in this country are able to procure the quantity of butcher meat they would require.

CLASS 3.—*Diseases arising from Different Trades and Occupations.*—Various diseases are induced amongst artisans from the fine particles of the substances which they work amongst being absorbed into the system, either through the medium of the skin, lungs, or stomach; or, by the mechanical effects which they produce in irritating or affecting the particular part of the body with which they may come constantly in contact.

All workmen in mercury or quicksilver, as those employed in the quicksilver mines, looking-glass-platers, and button-gilders, experience very bad effects from the metal being absorbed into the system through the medium of the skin and lungs. Those employed amongst mercury in the mercurial mines of Spain, Hungary, and South America,

often exhibit the most melancholy effects of that most powerful mineral. When the workmen in those mines are not careful in changing their dress, and in often undergoing a thorough cleansing of their skin, they very early become affected with *the mercurial palsy*. In this disease, along with a constant shaking of the body, there are generally great swellings about the throat, accompanied with *apthous* sore mouth and gums, salivation, and eruptions of the skin; to these succeed constant restlessness and shaking, falling out of the teeth, a dirty hue of the skin, pains of the head and other parts, with great depression of all the vital powers, which symptoms end in convulsions and delirium. In such a state the poor slaves employed in those mines may live for a good many years, but their life is one of misery and wretchedness; many of them scarcely ever leave the mine, being so affected with the metal that they cannot stand the slightest exposure to the air.

Looking-glass-platers, and all gilders in mercury, suffer more or less from the fumes which arise in the different processes of their employment; they are often affected with *the palsy*, and other complaints, which render them broken down in constitution at an early age: being thus reduced, they are very unfit to withstand the shock of any severe disease. Such employments shorten the duration of life very much.

All artizans who work in lead are liable to a disease peculiar to the effects of that metal. The disease is called the *lead colic*, and is produced from the absorption of lead into the system in a similar way to that of mercury. It is supposed to arise very commonly from some of the lead, which may be adhering to the hands, being conveyed into the stomach along with the food; but it may also arise from the metal being absorbed by the skin itself. The *lead colic* commences with pains about the loins and back, accompanied with a griping of the bowels and severe pain at the pit of the stomach. To these symptoms succeed

extreme weakness, a dirty hue of the skin, tremulousness of the whole body, difficulty of breathing, and partial paralysis. At the termination of very severe cases, the paralysis often affects the whole body, and apoplexy or epilepsy terminates the sufferer.

Those most liable to lead colic are painters, plumbers, porcelain-makers, lapidaries, colour-grinders, glaziers, shot-manufacturers, and lead-miners; but every employment where lead is used, even in very small quantities, renders the workmen liable to the disease, unless they use the precautions necessary in avoiding the influence of the metal. It is calculated that more than one in twenty affected dies of the complaint, not to speak of the bad constitutional effects which it otherwise gives rise to. The above class of workmen are seldom healthy.

Working amongst the most of the other metals does not seem to be so dangerous as in the above-mentioned. Brassfounders, coppersmiths, engravers, and iron-finishers, never suffer from the metals being absorbed into the system; but they have often inflammatory affections of the throat, lungs, and eyes, arising from the mechanical irritation produced by the fine filings coming in contact with these parts.

Those employed in the manufacture of the acids, and other chemical preparations, always suffer from the acrid vapours or fumes which arise from the different ingredients used in those processes. The chief effect produced is chronic inflammation of the *bronchi*, which brings on asthma and general bodily weakness. Suffocating doses of strong gas frequently end fatally, causing death by *asphyxia*. Men employed in the manufacture of chlorine for bleaching are always very thin, and are very subject to asthma and dyspepsia; but it is thought that they are almost proof against any infectious disease.

Butchers, glue-makers, catgut-makers, and tanners, though always exposed to disagreeable animal effluvia, are generally very healthy; and it is universally admitted that

they are very seldom affected with consumption or any constitutional weakness.

Bakers, millers, maltsters, wood-turners, cabinet-makers, veneer-sawers, button-mould-turners, knife-grinders, needle-pointers, flaxdressers, quarriers, masons, marble-cutters, and starch-makers, are all very liable to inflammation of the air passages, from the fine particles of the different substances being inhaled into the lungs. Their chief complaints are general thinness of body, *asthma*, different affections of the stomach, and often eruptions of the skin, arising from bad digestion and exposure to *dust:* those employed in horn and pearl button manufacture, needle-pointing, stone-cutting, and dry-grinding, seldom live above forty years of age.

As there are some particular trades and employments which give rise to consumption much more than others, and as *M. Benoiston de Chateauneuf* has investigated this subject very particularly, we will present a condensed view of his conclusions. He states that in the parish of Meusnes, of a population of 1200, 300 families are employed in the manufacture of gun flints. This parish supplies the most of the continent of Europe with this article. The French Government requires ten millions of flints annually, and about 280 millions are exported. It appears that this singular employment is very destructive to human life. Before flints were used for firearms, the mortality in the parish was 1 in $33\frac{1}{4}$; of the births, one-half survived till the eighteenth year, and the mean duration of life was $24\frac{1}{4}$ years. But after the establishment of the manufacture of flints, the mortality became 1 in $22\frac{3}{4}$; half the births were cut off by the fifth year, and the mean term of life was reduced to $19\frac{1}{6}$ years. This fearful increase of the mortality arises from consumption of the lungs engendered by the inhalation of the flint dust. Now, from the whole of the cases admitted into the hospitals in Paris, M. Benoiston has estimated the rate of mortality from consumption to be, in 1000 admissions, 28.5 deaths

for men, and 47.5 for women, which proportions he adopts as a comparable standard in investigating the tendency to consumption produced by different employments. Of 1000 admissions there are, who die of consumption—rag-pickers, men 8, women 17; starch makers 10; cotton-spinners, men 19, women 27; bakers 21; thread-makers, men 23, women 34; grain market porters 24; charcoal porters 37. These are all occupations amongst *vegetable* dust, and our author is of opinion that they engender consumption more than those giving rise to *mineral* dust; in proof of which it is stated, that, "Among the stone-cutters, the deaths from phthisis are only nine in every thousand admissions—among marble-cutters 12.5; quarry-men 14.5; masons 22; plasterers 25. In those exposed to *animal* dust the proportion is much higher. Among carders and mattress-makers the deaths are 31 per thousand of the admissions; brush-makers 35; hat-makers 48; feather-workers so great as 80." Among gilders, decoration painters, and smoke-curers, the deaths from consumption are 53.22 and 33.5 respectively. Among washermen the deaths are 18; among washerwomen 45. "Of late (says M. Benoiston) there has been a disposition to ascribe a phthisical tendency to those trades in which the arms and chest are habitually exercised with violence. How far this suspicion is true will appear from the following data:—Among locksmiths the deaths from phthisis are 7.5 per thousand; blacksmiths and farriers 9; log-sawers and stone-sawers 11; carpenters 15; weavers, men 21, women 18; water carriers 24; cabinet-makers 31; gauze-workers, men 32, women 31.5." Now, according to M. Benoiston, the proportion of deaths from pulmonary consumption to the whole of the admissions into the Parisian hospitals, is 28.5 per thousand for men, and 47.5 per thousand for women, which of course includes all trades together; so it will be readily observed that very few of the above-mentioned trades exceed the average of the whole, and that, consequently, only a few of them can be ranked

as trades which particularly dispose to phthisis. But the case appears to be very different in those trades of a very sedentary nature, and requiring a constrained position of the body, with great exercise of the superior extremities. In such trades, "the deaths for every 1000 admissions are as follows:—Shoemakers 43; polishers 44.5; lace-fringe-makers 47; tailors 47; crystal-cutters 61.5; and jewellers 64. In female trades of the same kind, we find the deaths among polishers to be 38; tailors 46; fringe-makers 47; mantuamakers and milliners 55; shoe-binders 55.5; botchers and menders 61; lace-workers 62; glovers 64.5; embroiderers 86; artificial-flower-makers 115; jewellers 133. We see here explained the source of the immensely greater prevalence of phthisis among females than among males."*

*Influence of Professions on Health and Longevity.*—Lawyers and medical men are much exposed to many of the bitter jarrings of life, and they have generally to think much, and to *bear* much, in the most of their professional engagements; their labour is often protracted and hopeless, and it very frequently ends in bitter disappointment, both regarding worldly and professional success. Clergymen, on the other hand, are more softly dealt with; they have their permanent livings, and are consequently in a great measure independent: their labour may at times be laborious, but they have the power of directing it themselves, and are therefore very seldom obliged to undergo much fatigue beyond their bodily or mental energies. Of all the professions, it appears that clergymen are the longest lived.

"In professions, of those who attain the age of 66, there are found to be—

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|---|---|
| 43 Theologians. | 32 Clerks, &c. |
| 40 Agriculturists. | 29 Advocates. |
| 35 Men in office. | 28 Artists. |
| 35 Merchants. | 27 Professors. |
| 32 Military. | 24 Medical Practitioners. |

* Edin. Med. Jour., Oct. 1, 1831; Annales d'Hygiene Juillet 1831.

"In 1000, only 228 medical men live from 63 to 72, and 328 theologians; from 73 to 82, but 141 and 225; and from 83 to 93, 30 and 70. Till 62 the medical men are more than the clerical."*

Upon the whole, professional and scientific pursuits dispose to longevity. "In France, 152 men of science and letters have been taken at random; half the number appear to have cultivated science, and about half to have been devoted to general literature. On adding together the age at which each had died, it was found that the average result would be above 69 years for each of the 152 individuals."†

According to Dr Bellefroid, the probability of life in the different classes is quoted as follows:—

"Calculated from the 28th year of age, the probability of life may be estimated in—

| | | | |
|---|---|---|---|
| Catholic priests to be to the age of | 69 | Merchants to be to the age of | 64 |
| Protestant clergymen, | 65 | Physicians—theoretical, | 64 |
| Savans, | 66 | Physicians—practical, | 64 |
| Professors in universities, | 63½ | Female artists, literary characters, actresses, | 63½ |
| Military officers, | 64½ | Barristers, | 62 |
| Poets, | 61 | Kings, | 56½ |
| Artists, | 62 | Mendicants, | 56 |
| Farmers, | 64 | | |

"As an appendage to the preceding table, we may state that it has been estimated that 13 only out of 100 kings attain the age of seventy years; whereas, to the same period of life, not fewer than 46 catholic priests, 41 savans, 37 farmers, 36 military officers, 33 professors, 29 barristers, 26 physicians, and 21 mendicants, are calculated to survive; the date from which the calculation is taken, being usually the 21st and 22d years of life.

"The general conclusion to be derived from these data must be at once obvious. The average life of kings is

* Million of Facts.

† Hawkins' Medical Statistics.

short, compared with that of clergymen and philosophers, who,

> Along the cool sequestered vale of life,
> Have kept the noiseless tenour of their way.

"And who can wonder at this, when they consider the career of the former, their life being one of ceaseless and most fatiguing excitement, minds as well as bodies inflamed by ever-recurring sensual enjoyment, and exhausted by the constant turmoil of unrestrained passions. Tossed about between the extremes of joy and grief, it is only by stealth, as it were, that they can taste that peace of heart and that silence of the feelings which are so essential to the calm and unconscious flow of life. How different the career of the contented catholic priest! The temperance, the chastity, the absence of all the violent passions, associated too with a due activity alike of the body and of the mind—these are the elements of the healthfulness and longevity of such a profession.

"If we now turn to the life of poets and artists, we find that on the whole they too do not live so long as clergymen, the excitability of their passions, and the over vivacity of their temperament, being doubtless unfavourable to the tranquil movements of prolonged health.

"We may be at first surprised to hear that officers are among the most favoured of the classes, and also that the life of barristers is not so good as that of artists and poets. But we should remember that the above table comprises only the superior officers, who are almost always 30 years of age or upwards when they attain to high rank in either service; and that many barristers are not more than 20 years of age, and scarcely any exceed the age of 25 when they become so.

"So much for other professions; let us now hear what our author has to say on the case of doctors.

"Their profession," he remarks, "does not make any

demands on the imagination, and, moreover, the mental effort expended upon its pursuit has no tendency to exhaust the mind. With medical men it is rather the machine, the body, than its moving principle, the soul, which wears itself out—*aliis inserviendo consumuntur, aliis medendo moriuntur.* The physician is exposed to all sorts of revolutions of his material life—his sleep is apt to be disturbed; his meals to be interrupted; his sensibility is often wounded by a constant spectacle of human suffering and distress; his life, in short, is a ceaseless travel through hot and cold, dry and wet; and, at the end of all his anxieties and fatigues, his recompense is too often a miserable fee; and if it is sometimes given with marks of gratitude, this is quickly forgotten when health is restored."

"From the preceding memoranda, the reader will doubtless agree with our author, that he who desires long life, should pray to be neither a king nor a beggar, 'to have neither poverty nor riches'—not a pampering superfluity on the one hand, nor a pinched insufficiency on the other, and, withall, have not too much pity, nor too lively an imagination; lastly, *he should not be a physician.*

"Our author, in another part of his paper, remarks that the average life of mendicants, if taken at 25 years of age, is nearly 55 years; whereas that of the kings of France has not exceeded 48 or 49 years, and it is almost as long as that of German physicians and of English poets."*

All civilized pursuits and influences have some effect in shortening man's existence. Dr Price has emphatically said, "The marts of commerce are the graves of men." Merchants are a class of men who suffer very much from their business, especially if it be of a speculative nature. It is thought that more merchants become insane than of any other class, and such is not to be wondered at when we take into consideration the mental perturbation which

* Medico-Chir. Review, April 1840; Bulletin Medical Belge.

must be often excited regarding the success or not of their speculations. We seldom find keen business men very healthy, unless they are somewhat easy in their circumstances; or, on the other hand, unless they are quite regardless of the consequences, having little or nothing to lose. Individuals who are close tied down to the desk very often suffer from a sort of cachexy or broken down state of the system generally; and, consequently, clerks, advocates, and literary characters are, in general, short-lived. But the health of individuals in every sphere of life is very much influenced by other circumstances, which may be reckoned quite apart from their worldly employments. Every sort of irritation or anxiety regarding grievances into which casual occurrences in life may have drawn individuals, always tends to injure the health, and too often lays the foundation of insidious and dangerous diseases. Domestic troubles, public and private calumny, religious doubts and fears, disappointments, and all sorts of bitter associations in every-day transactions, all tend to undermine the health and cut life short in an insidious way. Perhaps nothing tends more to injure the health of sensitive parents than sudden and painful family bereavements. There is one particular influence, however, which our attention has been called to of late, and which deserves the utmost attention from every individual in a status of society which may render him liable to its pernicious effects, namely, that horrid perturbation of mind which is generally kept up by protracted law-suits. The public are very much indebted to Dr Jonathan Osborne, for bringing forward a case of what he terms *Chancery Cachexia*, which occurred to a respectable clergyman who had the misfortune to be engaged in a long litigation in the Court of Chancery. The case ought to be rivetted upon the mind of every individual, as a beacon against entering into such a continued source of mental and bodily disquietude. We are sorry that the length of the case precludes the possibility of giving it here; but the reader will find it in the Edinburgh Medical Journal for January 1840.

## PART II.

### On the Influence of Sex and Marriage, on the Duration of Life, and on the Statistics of Still-Born Children.

*On the Influence of Sex on the Duration of Life.*—When we take into consideration the many relative differences which exist betwixt man and woman, both regarding their physical, moral, and secular habitudes, we are naturally led to think that there must also be some difference in the general consequences of all those actions in life, which are, as it were, the final purposes of our creation—all tending to bring about that great change which at last severs vitality and organization. The two sexes, from their very earliest years of childhood, differ entirely from each other both in their mental and corporeal impressions—the little boy stretches out his hand and grasps at the whip and the mallet, whilst his little female associate plies her tiny hands in imitation of future maternal and domestic duties. Such differences, trifling though they may appear, show that the two are naturally different beings in respect to those instinctive attributes which are to fit them for their respective spheres in life. And as they ascend the ladder of worldly pursuits, the life and employments of each are so very different that the two individuals can scarcely be compared as even similar creatures. They are unlike each other in their physical appearance, in many respects in their mental endowments, and, above all, in their general pursuits in life. Such differences, in relation to all those influences which are continually affecting the system, we are led *à priori* to think must lead to some differences also in relation to the various effects produced upon the corporeal frame. It has been generally supposed that the mortality of females is less than that of males. According to the Swedish Tables, and likewise those of Belgium, the mortality of females is less. But from the statements

given by Mr Farr, it appears that it is only the case in childhood and after the age of 50: the mortality being greater among females between the ages of 10 and 40 than amongst males.*

According to the Tables of Mr Rickman of the burials in England and Wales for the 18 years betwixt 1813 and 1830,

| | |
|---|---|
| There died under 14 years, | 865,037 males, |
| ........................... | 743,000 females. |
| Giving an excess of | 122,037 male deaths. |

The number of deaths between 14 and 45 was—

| | |
|---|---|
| Females ..................... | 453,751 |
| Males ..................... | 405,481 |
| More females buried ........ | 48,270 |

In the next period of 20 years, namely, from 45 to 65, there were more males died.

| | |
|---|---|
| Males ..................... | 316,977 |
| Females ..................... | 301,945 |
| More males .............. | 15,482 |

So, "In the twenty years from 5 to 65 more males were taken off; from 65 to 70, the proportions a little alternate between those who die of each sex; but, from 70 to 117, when the female world have discharged all their maternal and worldly duties, and have become less necessary to society, and are then rather its venerable ornaments than its helpers, the largest proportion of deaths falls continuously on them. Yet here, again, so modified is the remaining operation, that although they die most numerously, they are still the largest number of the living, and even to the last extremity of human existence; for

* M'Culloch's Statistics.

there were above 1,000 more females than males at the age of 90, and 69 more at that of 100. They even had the triumph of the most protracted longevity in the catalogue of the 18 years' deaths: for the longest liver, who is recorded to have died at that time, lasted to 124, and this was a female. On the whole there were in 1821, living, in England and Wales, of all ages, 227,567 more of the feminine sex than of the other. Thus, the living fabric of society in this part of our island was composed of 62,538 more boys, in the ages under 15, and 291,105 more grown-up females, in all the subsequent years, from fifteen to the duration of a century." *

Mr Tulloch states that, in all our West India colonies, female life is much better than that of the males, amongst the whole negro race—there being a remarkable superabundance of females as compared with males. This is thought to arise from the female constitution being more easily assimilated to foreign climates.†

According to Dr Bellefroid, an able statistical writer in Belgium, "The average life of males is, in general, shorter than that of females at every period of life. Even in reference to still-born children there are many more such among male than female births—omitting from our consideration the excess of the former over the latter.

"In Belgium, of 2597 still-born children, 1517 were males, and only 1,080 were females—a proportion of nearly 15 to 10, while the proportion of the male births to the females is as 15 to 14. The same result has been found at Hamburgh, Paris, and Geneva; and we are told that, in Prussia, during the years from 1826 to 1831, there were 59,144 still-born males, and only 43,533 still-born females. Dr Caspar has calculated that, if the chances of life were equal in the two sexes, the number of

* Sharon Turner's Sacred History of the World, vol. iii., letter xxi.

† British Annals of Medicine, Nos. xiii. and xv.

still-born males should not have exceeded 45,709 instead of 59,144. It is certainly not easy to determine the cause of this very marked difference in the mortality of the two sexes at the period of birth. Dr Joseph Clarke, and more recently Dr Lombard of Geneva, have accounted for it by the greater size of the male over that of the female children, and by the consequent greater impediments to an easy delivery.

"But although we admit this explanation, how are we to account for the female sex retaining the advantage at every period of life?

"In England the probable or insurable life of female children, at the period of birth, exceeds by about five years that of males. It is true that they lose this advantage after the first year, and that their chances of life are even less than those of boys at 4, 7, 8, 9, 11, and 14 years of age; but at 15 years—the age which usually indicates puberty—they recover in part the advantage which they had at the period of birth, and they continue to retain it with only slight exceptions, till about the 75th year, when the chances of the two sexes are about equal.

"The following Table will indicate the ratio of mortality among the two sexes at different periods of life in Belgium:—

| Age. | Loss per cent among Males. | Loss per cent among Females. |
|---|---|---|
| From 0 to 1 year | 22.0 | 17.6 |
| 1 5 | 15.0 | 14.4 |
| 5 10 | 4.5 | 4.1 |
| 10 20 | 5.9 | 5.2 |
| 20 30 | 7.5 | 8.8 |
| 30 40 | 7.4 | 7.2 |
| 40 50 | 5.7 | 6.7 |
| 50 60 | 32.0 | 36.9 |

"From this table it appears, that during 'certain' periods the mortality is greater in the female than in the male sex; but with these exceptions the advantage is de-

cidedly in favour of the *beau sexe;* and they scarcely deserve to be considered, if we bear in mind that the number of women who reach the age of 20 years is much greater than that of men.

"It is certainly not very easy to account for the almost uniform greater mortality among males after the period of puberty. Writers have alluded to the destruction of health from the dangers and excesses, both physical and moral, to which the one sex is exposed more than the other, to the havocs of war, to the losses at sea, &c.; but these influences, though certainly not inoperative, are not sufficient to explain the question at issue. M. Benoiston has found that a similar excess of mortality in the one sex exists among monks and other male recluses compared with that among nuns."*

According to the Report of the Registrar-General for 1839, 2,811 mothers died in child-birth and miscarriage, or about 5 in the 1,000. In the preceding year it was 4 in the 1,000. Of 200,000 deaths there is only one from stone and gravel among females; but there are eight among males. The deaths from cancer, on the other hand, are nearly three times more prevalent among females than males. In nervous diseases there are 123 deaths of males for 100 deaths of females. For 8 men who die of apoplexy there are 7 women, but for 7 women who die of paralysis there are only 6 men.

Mr Forbes Winslow has shown that, women are much less liable to sudden deaths than men, the proportion being as 10 to 18. In 1838 there were registered 3,012 cases of sudden death, of which 1,840 were males, and only 1,172 females.

*Influence of Marriage on the Duration of Life.*—Some very eminent continental writers have affirmed that celibacy shortens life, and from the researches and calculations of Dr Odier it appears that such is really the case. His

* Medico-Chirurgical Review, January 1840.

conclusion is that the duration of life in married women is greater than that of the unmarried, excepting in very old age. "'At the age of 20 the difference is at least 10 years in favour of the married.' The correctness of this conclusion has been amply confirmed by the researches of M. Caspar of Berlin, and also M. Benoiston. The former of these authors gives the following Table, prepared from the Mortality Registers of Amsterdam, from the year 1814 to 1826:—

*Mortality in a Hundred.*

| Age. | Husbands or Widowers. | Unmarried Males. | Wives or Widows. | Unmarried Females. |
|---|---|---|---|---|
| 20 to 30 | 3.6 | 43.1 | 4.7 | 26.5 |
| 30 45 | 7.9 | 27.1 | 16.5 | 24.5 |
| 45 60 | 29.2 | 15.6 | 22.6 | 19.2 |
| 60 70 | 22.0 | 8.1 | 22.3 | 13. |
| 70 80 | 19.4 | 4.3 | 22.9 | 11.6 |
| 80 90 | 7.0 | 1.4 | 9.6 | 4.2 |
| 90 100 | 0.8 | 0.0 | 1.2 | 0.7 |

"It should be remarked, in reference to the difference of mortality among the married and unmarried men from the age of 20 to that of 30 years, that the disproportion is not really so great as the table seems at first sight to indicate, for, in Holland, as in Belgium, the greater number of marriages among men occur at from 28 to 30 years of age; and those persons who marry earlier are generally in easy circumstances—the favourable influences of which on the duration of life we shall presently show. On the other hand, the apparent excess of mortality among married men, as life advances, will deceive us, unless we keep in mind that at the age, say, of 45 years a much greater number survive among them than among *celibitaires*. It is however remarkable, that of an equal number of 100 individuals of each class there survive only 27.2 married men at 70 years of age, whereas there remain only 5.7 *celibitaires* at the same period of life. M. Benoiston is of opinion that the probable life of a married man at the age of 20

exceeds by 19 years that of a bachelor at the same period of life.

"The beneficial influence of life is certainly more striking in the male than in the female sex; but even in the case of the latter it is only necessary to look over Caspar's Table to discover that at almost every period of life the advantage is decidedly in favour of married women.

"M. Benoiston has calculated what he considers to be the chances in favour of married over unmarried men at different periods of life, and the results may be briefly stated in the following table:—

| Age. | Difference in favour of Married Men. |
|---|---|
| 30 | 17 years. |
| 45 | 18 |
| 60 | 8 |
| 70 | 4 |
| 80 | 1 |
| 90 | 0 *" |

*Statistics of Still-Born Children.*—When we consider the potent influence which all the different circumstances and habits of life have in peculiarly affecting the female system during gestation, we must be prepared to assent to the proposition that the proportionate numbers of still-born children varies very much in different countries.

In England 1 infant in every 58 is still-born—in Prussia 1 in 32—in Sweden 1 in 40—in Hanover 1 in 30—in Bohemia 1 in 63—Lower Austria 1 in 41. In cities and towns the proportion is much higher than in the country. In London it is 1 in 24—in Edinburgh 1 in 25—in Glasgow 1 in 14—in Paris 1 in 19—in Hamburgh 1 in 15—in Presburg 1 in 25—in Innsbrück 1 in 18—in Geneva 1 in 15—in Marseilles 1 in 16.

According to the different records the proportion of still-born male to that of female infants is about 13 to 10, or nearly a fourth more.

* Medico-Chirurgical Review, January 1840.

There are more still-born children in cold than in temperate climates—the number is greater in winter than in summer—and there is three times the number in illegitimate births.

In Geneva, "of 9,833 *legitimate* births, during the whole period of 20 years, 517 children were born dead, or one in every 19. Out of 1,092 illegitimate there were 129 born dead, or 1 in 8.4 cases.

"From October 1835 to October 1836, in the Lying-in Charity of Guy's Hospital, there were 630 births, and among these thirty-four were born dead, in about *equal proportions* of the two sexes. * * * The ratio of the still-born here amounts to one-eighteenth of the total births.

"Out of 766 applicants to the Charity during the year, it was ascertained that 643 had already given birth to 2460 children, of which 133 were still-born—a ratio of one in eighteen. It is curious thus to find that the ratio should be alike, although, as will be perceived, the births from which they were deduced were four times as numerous in the one case as in the other. This fact, in our view, furnishes, at the same time, strong intrinsic evidence of our having reached a near approximation to the truth." *

* British and Foreign Medical Review, July 1837.

# CHAPTER VI.

On the Political, Criminal, Civil, Domestic, and Religious Causes of Death.

*Political Causes of Death generally considered.*—As a country is well governed by laws calculated to promote the comfort and happiness of the mass of the people, so will the general health, and prosperity, be increased accordingly. All political improvements in a country undoubtedly lead to further improvements in the different classes of society; consequently, there ought to be a progressive amelioration of the condition of the people under a just and well-directed system of government. That such is really the case we can scarcely doubt; for, when we reflect on the awful enormities committed by the despots of barbarous ages, and compare the condition of the people, under such circumstances, with that of the present age in the different enlightened countries, it must be admitted that political rule is all-powerful both in abasing and in exalting the human character.

It cannot be said that politics has altogether remained stationary, for in this, as well as in other sciences in the most of countries, there has been a gradual progression; chiefly in improvements, however, more particularly calculated for the general aggrandizement of the nation, than for the direct relief of those classes of operatives whose welfare ought to be religiously regarded by every government. In almost every system of government, even of the present day, there exist many laws which operate chiefly to the advantage of the few and the disadvantage of the many, and which, consequently, are a direct cause of much poverty and suffering amongst those whom they

most affect—namely, the operative classes. Every where our feelings are shocked by the wretched appearance of numerous individuals ; but such anomalous cases cannot be attributed directly to the effect of the general laws of the country, for there are individuals, yea, even classes of individuals, who keep themselves in misery by their own bad conduct. Certain enactments do tell very severely upon the working classes, and although the great majority of these classes contrive to live according to the existing emergencies, still there are a great many, with large families, who cannot possibly live at all ; consequently, many individuals either become a burden upon others, or are obliged to commit depredations which ultimately render them victims to the criminal laws.

But limited means of subsistence always render a people more liable to the inroad of disease and death, as is too often exemplified in the increased mortality which accompanies those privations which arise from scarcity of labour. All laws which bear in the slightest as restrictions on trade, ought to be done away with so as to accommodate all classes in a just and regular way, according to the meed of their respective avocations. During the late, indeed we may say the present, stagnation of trade, articles of provision have been very high ; which circumstance must have contributed very much to the spreading of those infectious fevers which have prevailed lately to such an excess in our principal cities and towns, not to speak of the other privations and sufferings which have been endured by a very large proportion of the working population. Owing to the dulness of trade, and the consequent scarcity of money amongst the dependant classes, provisions would of necessity have fallen very much in price, if the existing Corn Laws did not operate to the direct effect of limiting the people to a certain amount of sustenance only, and which is nothing less than a national system of starvation. The effects of such laws in increasing the mortality of this country can scarcely be reckoned ;

the whole system is a disgrace to civilization and Christianity, and every man who vindicates it lends his voice to the support and continuance of laws, the direct tendency of which is the starvation and untimely death of his fellow-creatures.

It is very justly stated, that "Mr Farr believes that, by proper hygienic measures, it is possible to reduce the annual deaths in England and Wales by 30,000, and to increase the vigour of the population in an equal proportion. Of this we ourselves entertain no doubt. When we look to the obvious causes of disease which are abounding—to the intemperate habits—the immoral license—the crowded habitations—and the filthy quarters of the poor in towns, we cannot but feel how materially a diminution, not to say suppression, of these evils must contribute to the health, the energy, and the happiness of the English people. Growing as the population is in numbers, agitated as it is with the inquiry into the nature of political institutions, it becomes yearly a more anxious subject of solicitude to Government, and of interest to humane and thinking men. Some of the difficulty of bettering the people's condition will assuredly be lightened by medicine and statistics."*

*Mortality from War.*—As a political cause of death, war may be considered the most appalling. In whatever way war originates, it is one of the most severe calamities which a country is liable to, both as affecting the general good, and the lives of those more immediately engaged in it. Of the necessity of war, under particular circumstances, we cannot doubt, but of the consequences which generally ensue we have much reason to deplore. Of the great destruction of human life in the different wars, we have ample accounts in the page of history. Yes, we have only to take a leaf from our historians in order to

* Johnson's Medical Review, Oct. 1839; Report of the Registrar General.

estimate the awful sacrifices which have been made of human feelings, of human happiness, and of human life. What countless thousands have been massacred at the shrine of tyranny and ambition!

It is estimated that, in the last 4000 years, the following number of the human race have perished by violent deaths in the field of battle, or have been slaughtered in the sacking of cities:—

| | Millions. | | Millions. |
|---|---|---|---|
| Bacchus, &c., | 15 | Crusades, | 40 |
| Sesostris, | 15 | Saracens, | 60 |
| Semiramis, | 10 | Reformation, | 30 |
| Cyrus, | 10 | Tartars, | 80 |
| Cambyses, &c., | 25 | Turks, | 60 |
| Alexander, | 10 | Chinese, | 100 |
| His Successors, | 20 | French Revolution, | 60 |
| Jewish Wars, | 25 | American Wars, | 40 |
| Romans, before Cæsar, | 60 | African, do. | 100 |
| Grecian Wars, | 15 | | |
| Other Ancients, | 25 | Killed in Battle, &c., | 980 |
| Twelve Cæsars, | 30 | Severely Wounded, | 2940 |
| Roman Empire, | 60 | Famine and Suffering, | 2940 |
| Northern Nations, | 50 | | |
| Middle Ages, | 40 | | 6860 |

At the rate, in 4000 years, of 1,715,000 per annum, or seven times the present number of the species!*

According to Dr Dick, the talented author of the Philosophy of Religion, and other works, the following numbers have been slain in different battles:—

In the year 101 before Christ, in an engagement between Marius, the Roman Consul, and the Ambrones and the Teutones, were slain 200,000; in the following year, the Romans slaughtered 140,000 of the Cimbri; in the year 105 B.C., the Romans, in a single engagement with the Cimbri and the Teutones, lost upwards of 80,000 men; in the battle of Cannæ, above 40,000 Romans were left dead on the field, and 6000 of the Carthaginian army; in the battle of Issus, between Alexander and Darius, were slain 110,000; in the battle of Arbela, two years

* Million of Facts.

afterwards, between the same two despots, 300,000 ; in the battle between Pyrrhus and the Romans, 25,000 ; in the battle between Scipio and Asdrubal, 40,000 ; in the battle between Suetonius and Boadicea, 80,000 ; in the siege of Jerusalem by Vespasian, 1,100,000 ; in Jerusalem, in 170 B.C., by Antiochus, 40,000 ; at Cyrene, there were slain of Romans and Greeks by the Jews, 220,000 ; in Egypt and Cyprus, in the reign of Trajan, 240,000 ; and in the reign of Adrian, 580,000 Jews. After Julius Cæsar had carried his arms into the territories of the Usipetes in Germany, he defeated them with such slaughter that 400,000 are said to have perished in one battle. At the defeat of Attila, there perished about 300,000 ; in the year 631, there were slain by the Saracens in Syria, 60,000 ; in the invasion of Milan by the Goths, no less than 300,000 ; and in A.D. 734, by the Saracens in Spain, 370,000 ; in the battle of Fontenoy, were slaughtered 100,000 ; in the battle of Yermouk, 150,000 ; and in the battle between Charles Martel and the Mahometans, 350,000 ; in the battle of Muret, in A.D. 1213, between the Catholics and the Albigenses, were slain 32,000 ; in the battle of Cressy, in 1346, 50,000 ; in the battle of Halidon-hill, in 1333, 20,000 ; in the battle of Agincourt, in 1415, 20,000 ; in the battle of Towtown, in 1461, 37,000 ; in the battle of Lepanto, in 1571, 25,000, at the siege of Vienna, in 1683, 70,000 ; and in a battle in Persia, 1734, 60,000.

The whole number of souls who followed Xerxes into Greece amounted to 5,283,220, which is more than the whole of the male population of Great Britain and Ireland. Only 3000 of this vast army with difficulty escaped destruction.

The destruction of life by war in the Roman empire is beyond all calculation. Procopius remarks, "It is no exaggeration to say that five millions perished by the sword, and famine, and pestilence." The same author states, that, during the twenty years' war which Justinian

carried on with the Gothic conquerors of Italy, the loss of the Goths amounted to about 15,000,000; nor will this appear incredible, when we find that, in one campaign 50,000 labourers died of hunger. About the beginning of the thirteenth century, and during the last twenty-two years of the reign of Jenghis-Khan, no fewer than 14,470,000 persons were butchered by this scourge of the human race, in the eastern countries. During the Crusades, several millions of deluded mortals perished from the earth; more than 850,000 Europeans were sacrificed before they obtained possession of Nice, Antioch, and Edessa; at the siege of Acre, 300,000 were slain; and at the taking of Jerusalem, in 1099, about 70,000.

Dr Dick estimates that more than *fourteen thousand millions* of human beings have been slaughtered in war since the beginning of the world, which is about *eighteen times* the number of inhabitants which at present exist on the globe. And he concludes by saying, "What a horrible and tremendous consideration! to reflect that 14,000,000,000 of beings endowed with intellectual faculties, and curiously organized by Divine wisdom—that the inhabitants of eighteen worlds should have been massacred, and mangled, and cut to pieces by those who were partakers of the same common nature, as if they had been created merely for the work of destruction! Language is destitute of words sufficiently strong to express the emotions of the mind, when it seriously contemplates the horrible scene. And how melancholy is it to reflect, that, in the present age, which boasts of its improvements in science, in civilization, and in religion, neither reason, benevolence, nor humanity, nor Christianity, has yet availed to arrest the progress of destroying armies, and to set a mark of ignominy on 'the people who delight in war!'"*

*Consequences of War.*—Some imagine that war is often advantageous, from its thinning the numbers of mankind,

* Philosophy of Religion, p.p. 417—423.

and also from its creating an increased demand for particular kinds of manufacture. No doubt such are the immediate effects of war; but as both of these results can only be sustained by a temporary increased exertion of the national powers, both as respects a rapid reproduction of the species, and a forcing of manufacture, from a constant demand of articles required, it follows that the direct tendency of such consequences is to exhaust the energies of the national powers. The greater the mortality, or the greater the numbers that are killed, there must be a corresponding demand, or necessity for the reproduction of individuals in their place, and consequently superfluous numbers are born at the general expense of the nation; for, as we will afterwards see, the greater the proportion of births in any country the greater is the proportional mortality, because early life is the most precarious period of man's existence. The same holds good in respect to the increased demand for certain kinds of manufacture. The high prices offered, along with the certainty of returns, excites every individual to manufacture to the very utmost, which ultimately gives rise to such a redundancy of goods and machinery as entirely to supersede the demands; and, after the bustle has subsided, both men, machinery, and manufactured goods, have to lie for a time as accumulated national lumber, which can only be kept up at great loss and expense. War invariably involves a nation in pecuniary and other difficulties, which requires many years of peace and prosperity to overcome.

*Mortality of the Army and Navy.*—We have not the means of coming to correct conclusions regarding the rate of mortality in the military and naval departments of different countries.

According to the military medical reports of Major Tulloch, it appears that the ratio of mortality in the British army is higher than among civilians, being at least one-third higher among the dragoon guards and dragoons, than among an equal number of civilians of the same age. The

average rate of mortality among the dragoon guards and dragoons, is about 1 in 67, which is much lower than that of civilians in general, but of course must be reckoned much higher on taking into account the differences in the rate of mortality in the different epochs of life. As soldiers are seldom enlisted under eighteen years of age, and as they are always discharged before they are very old, the ratio of mortality among them ought to be much lower than in any population made up of all the different ages.

When we consider the *moral* of the soldier, we need not be surprised that the ratio of mortality in the army should be much higher than in civil life, for the military ranks are, generally speaking, made up of the most reckless characters—of those who have rendered themselves destitute through improvidence and misdemeanour. Such being the case, the great majority of our soldiers lead rather disorderly lives; and being, as they are, often shifted from one large town to another, they must suffer much in their health, both from undue exposure and the general causes of sickness.

But what a deplorable picture have we of the fate of our soldiers in some of our foreign stations compared with those at home. In Great Britain and Ireland the annual mortality of the troops is reckoned about 1.5 per cent, or one death in 66; in Malta it is the same; in Gibraltar the mortality of the soldiers is 1 in 50; in the East Indies it is 1 in 20 nearly; but in the West Indies it is, on an average, 15 per cent, or nearly 1 in 7!

According to Major Tulloch,* again, the mortality in Africa amongst the British troops is most appalling. Upon the Gambia, in Western Africa, it appears that an immense quantity of rain falls, and that the country is, beyond all others, fatal to human life. He states that life is scarcely worth a year's purchase—"double the original force of a garrison has been known to be cut off within

* Paper read to the Statistical Society, April 1840.

twelve months." It appears that a fatal year is generally succeeded by a period of salubrity, and hence the misrepresentations regarding the hygienic influence of the climate on European constitutions by many travellers. But as Major Tulloch's observations extend over a period of seventeen years, his statements may be taken as correct. "At the three stations of the Gambia, Isle de Loss, and Sierra Leone, the sickness and mortality of the white troops, from the year 1819 to 1836, showed that the mean strength was 1843, the admission to the hospital 5489, and the deaths 890; and thus, it appeared, that in the long average of 18 years, about one-half of the troops were cut off annually. In 1835 and 1836 nearly three-fourths of the white troops perished. It is but fair to state that the majority were of a class supposed to be the least fitted to endure the climate." But it appears that even the sober and well-behaved suffered nearly alike with their depraved comrades. And the mortality amongst the church commissioners was equally great—of 89 who arrived between 1824 and 1825, no less than 54 died, and 14 returned to England in bad health. At the Gambia and Isle de Loss, the mortality was much more appalling than at the other settlements; for of 220 troops who arrived at the former in May 1825, no less than 87 died before the 21st September, and on the 31st December there only remained 39. There were 200 Europeans sent to make up the deficiency—before three months had elapsed no less than one-half were cut off. During this dreadful mortality a detachment of 50 black soldiers only lost one man; and, during the period under investigation, the mortality amongst this class was only 30 per 1000. Even to negroes the climate is inimical, the deaths exceeding the births; and, were the population in these settlements not kept up by the importation of liberated slaves, they would soon become depopulated. At the settlements, about 1000 miles to the east, at Cape Coast Castle, Dix Cove, &c., although the ground is not swampy, but perfectly dry,

the mortality is equally great. A fatal influence, the cause of which cannot be traced to any visible agency, is thus proved to exist along a coast of 3000 miles; and it is singular that the Mediterranean coast of the same continent is not exempt from its baneful effects, as the French troops, ever since their settlement there, have been exposed to similar ravages. It cannot be ascribed to the miasma of marshes, as is erroneously supposed, from the circumstance that the fatality occurs at all times and in every variety of soil." Such statements show forth the fearful effects produced upon Europeans by foreign climates, as well as the very unhealthy nature of some districts compared with others.

The general mortality of the French army is reckoned at 1 in 48; but, according to Colonel Paixhans (in his statements concerning the mortality of the French army, made before the Chamber of Deputies, in the discussion regarding the levy of 80,000 conscripts, for the year 1838), the mortality of French soldiers, even during peace, is much greater than that of men engaged in civil pursuits. According to his statements the mortality of young men of 20 years of age, engaged in civil pursuits, was only about 1 in 83, and among those of 27 years of age about 1 in 71. In the army, among the non-commissioned officers, it appears that the mortality was only about 1 in 91, but among the senior soldiers, from 26 to 27 years of age, it was so high as 1 in 50; and among those who were only five years in the service, commencing at 20 years, the mortality increases to 1 in 33; among those of 4 years to 1 in 22; among those of 3 years to 1 in 19½; among those of 2 years to 1 in 15½; and among the young soldiers, those in the first years of service, the mortality was so very high as 1 in 13½. The annual mortality among the veterans in the Hotel des Invalides was 1 in 20; among the troops in the colonies 1 in about 14; and among those in Algiers about 1 in 12!

Such a fearful rate of mortality we could not have ex-

pected in the French army, considering the excellent discipline under which it is understood to be kept. But surely it arises in a great measure from the excesses of the soldiers themselves, for in time of peace they ought to be at least as healthy as any other class of men. The great mortality of the foreign stations, both amongst the British and French soldiers, shows, in a remarkable light, the powerful influence which change of climate has in inducing disease and death.

According to Chaucel, the mortality in the French army, when under active service, must have been very great, for with every heavy loss disease increased, which cut off fearful numbers.

Although the proportion of sick in every army is allowed to be much greater than in any other class, the mortality of the *army hospitals* is much less than that of *civil ones*, which arises from the great majority of the cases of civil hospitals being of an extreme nature, and, consequently, more generally fatal than the generality of cases either in military or private practice.

Sailors are longer lived than soldiers. The total mortality of the whole British navy in all parts of the world, including those who were lying in hospitals, was, in 1813, only 1 in 42. Dr Wilson estimates the mortality in our navy on the South American stations at about 1 in 51. In the Greenwich hospital, however, the average mortality of ten years is about 240 annually in 3000 men, or 1 in $12\frac{1}{2}$; but it must be recollected that the most of the inmates are old worn-out individuals.

Although sailors, generally speaking, are rather healthy men, and although a great proportion of them arrive at a good old age, they are not, upon the whole, possessed of very sound constitutions, for they do not stand disease well. The great majority of sailors suffer considerably from exposure and the nature of their diet. Being constantly exposed, they have often the seeds of internal complaints springing up into actual disease with every suc-

cessive exposure to the different exciting causes; and as their diet is, for the most part, of very stimulating properties, incipient disease is both fostered and aggravated in a system too replete in its own morbid tendencies.

But the health of sailors must depend a great deal both upon themselves and the general regulations of their ships, for it is well known that sickness aboard ship is chiefly in consequence of general want of cleanliness, sobriety, and good ventilation. This is sufficiently illustrated by comparing the results regarding the health of ships' crews in voyages made at different times under different commanders.

When Commodore Anson arrived at Juan Fernandez the half of his ship's crew only survived, and of the remaining 200 only eight were fit for duty. But in 1794, the Suffolk, a 74 gun ship, after being 162 days at sea, without any communication whatever with land, arrived in England without the loss of a single man, neither was there any scurvy or any other dangerous disease aboard. In the long voyages of Cook and Parry the advantages of a proper system of ventilation and cleanliness were very evident. These celebrated voyagers always managed their ships in such a way as completely prevented any of the dangerous diseases usually attendant on long voyages at sea.

*Criminal Causes of Death.*—Transgressions of the criminal laws very frequently originate in misery and poverty, arising from unfortunate circumstances, but they are far oftener the result of prodigality; of this we have too many convincing proofs. It is irregular conduct, generally speaking, amongst individuals and families that leads in the first place to want and poverty; these lead to theft, forgery, and family broils; and these again to drunkenness, fatal accidents, murders, and other crimes which often bring their victims to an ignominious, or premature end. Hitherto the civil authorities have had little power in counteracting those irregular habits which lead to such

consequences, unless in those offences which are held criminal; but it would be a wise provision in the laws of our country to enforce a becoming course of conduct on the part of parents toward the physical wellbeing and proper mental training of their children; and if satisfactory evidence could be produced in any case that a parent, through profligacy, kept his children in wretchedness and misery, the dereliction of duty ought at once to be met either with such measures as might be calculated to enforce a different line of conduct, or with condign punishment. It is such conduct, on the part of parents, which, to a very great extent, fills our prisons and bridewells; it ought, therefore, to be considered the chief cause of the most of crime, and should, if possible, be strictly looked into and suppressed. It may be said that irregular living and drunkenness combined is the most fertile source of crime, in proof of which we will quote a paragraph which has just appeared in that excellent publication, "Chambers' Journal."

"It has been always thought that crime abounds to a much greater extent in manufacturing districts than in rural ones. When figures are resorted to the very reverse appears to be the truth. In 1830 the proportion of thieves in the county of Edinburgh, a rural district containing a large non-manufacturing city, was as 1 to 1462 of the population, while the proportion in the manufacturing counties of Lanark and Renfrew was as only 1 in 2097. In non-manufacturing Sweden, the proportion of criminals is as five to one of what it is in manufacturing England. Another prevalent notion respecting crime is, that want is its chief promoting cause. Of a thousand criminals confined in Preston Jail, between October 1832 and July 1837, and into whose cases the Chaplain made the most minute investigations, 'want and distress' were alleged to be the prompting causes of the offence, even by the parties themselves, in only 76 instances. It may be added that 'idleness and bad company' were the causes in 88 instances, *and 'drunkenness' in no fewer than* 455, *or nearly a half*

*of the whole.* The prevalent notion as to the large share which drunkenness has in causing crime is thus supported by good evidence."*

From what is known of the wretchedness and misery which generally attends the unfortunate and profligate who fill our prisons, we would be inclined to think that the proportionate mortality amongst such a class, under such circumstances, would be very high; but the reverse seems to be the case—the average rate of mortality being not higher than in the population of the most of our healthiest cities. However, as the inmates of gaols and workhouses are generally individuals of mature ages, allowance must be made accordingly; but in the most of our prisons the mortality may be considered low; which, no doubt, arises from the great care and proper regulations in their government. According to Mr Cooper, the average mortality of the *King's Bench and Fleet Prisons* is not more than 1 in 55. The greatest rate of mortality any where known amongst adults is at the Depot of Mendicity of St Denis at Paris. Here the annual deaths are nearly 1 in 3 of every prisoner admitted! But the inmates are usually vagrants picked up in the streets of the capital, without asylum or resource, the victims of calamity, disease, or debauchery. In the generality of the prisons in Paris the mortality is about 1 in 23 annually. The mortality of the galley-slaves in France is only 1 in 49, while that of the whole French nation is 1 in 40. These slaves work in the open air, and are better clothed and fed than the other prisoners. The small proportion of deaths is partly owing to the absence of children, and persons above 70, at which last age they are released. Prisons in the Netherlands have a mortality of 1 in 27.†

*Executions.*—The numbers sentenced to death in England and Wales in 1805–6 were 282 and 268; in 1827 and

* Chambers' Journal, May 4, 1839, "Figures of Arithmetic *versus* Figures of Speech."

† Dr Hawkins' Statistics.

1829 the numbers were 1456 and 1311. In the years 1811, 13, 14, 16, 17, 22, 25, and 28, 601 were committed for murder; about half the number were executed. From 1688 to 1718, two-thirds of the capitally convicted were executed. From 1755 to 1784, a third; and from 1784 to 1814, one-fourth. Latterly, only an eighth.

In 1820 the executions for forgery were 20; in 1821, 16; in 1824, 4; and in 1829, 7. There have been 64 executions for forgery in 10 years.

From 1749 to 1756, 306 culprits were executed in London, in the next 7 years 139; and the following 7 years 233. In the bloody reign of Henry VIII., 22,000 were executed in England and Wales for civil, political, and religious offences.

During the middle of the reign of George III., the capital punishments in London were truly melancholy. "Every six weeks there used to be a public procession from Newgate to Tyburn, of from eight to fifteen and twenty criminals, chiefly youths; and, at the drop of the Old Bailey, fifteen or twenty were suspended at a time."*

In France in 1829, of 7373 accused, 4475 were convicted; of whom 89 were condemned to death.

In England, at the present time, the annual number of convictions, for murder, is about 14; in Spain, the number is 1200!

*Civil Causes of Death.*—In those parts of our cities, which bear the marks of olden times, we have standing monuments of the ignorance of our forefathers, regarding all they knew or all they could appreciate of the means of preserving health, and of guarding against the propagation or spread of disease. In our old towns the streets and lanes are narrow and crooked, the houses are high, and the apartments small; and there was a complete want of sewers for carrying off the impurities which must be generated in all densely populated places.

The decrease in the proportional mortality of our large

* Million of Facts.

cities is greatly owing to the excellent improvements which have, in late years, been effected in the above particulars. Our *new towns* are all built on quite a different plan from our old ones. There is first a regular plan laid down for the general guidance of the whole, the streets are generally straight, wide, well-drained, and well paved, with judiciously constructed sewers. The houses are not too high, the apartments are a good size, and the staircases are generally free and well ventilated. The back lanes are generally pretty wide and straight, running parallel with the principal streets. Such arrangements are eminently favourable to the general health of citizens, and are, along with domestic and personal cleanliness, and sober and plain living, the sure means of increasing the *mean duration of life* in all classes. Every town ought to have a good supply of pure water, and a good system of police to enforce public cleanliness. Under such a state of things people might enjoy as long a tenure of life in the town as in the country.

In all large cities the proportional mortality is much greater in the *old* than in the *new towns*. In some cities, such as Edinburgh, where the ventilation, generally speaking, is good, the difference may not be so great; but in others, as London, Paris, and Glasgow, the difference is very great indeed. In Paris, the mortality amongst the poor is more than double what it is amongst the rich.

According to Mr Farr the mortality, *cæteris paribus*, increases as the density of the population increases; but he says again, that the densest districts are not invariably the most unhealthy, because the unhealthy tendency can be counteracted by artificial agencies. In other terms, the mortality of cities in England and Wales is high, but it may be immeasurably reduced. It appears that the rate of mortality varies very much in different metropolitan districts. In Whitechapel the mortality is highest, the annual deaths being 3.908 per cent.; in St George, Hanover Square, it is lowest, being only 1.785 per cent. The

following Table of the mortality in different metropolitan districts is illustrative of this subject.

" TABLE—*Exhibiting the Mean Mortality, in three Groups, of the thirty-two Metropolitan Districts.*

| Districts. | Square yards to one person. | Annual rate of mortality per 100. | Annual Rate of Mortality per Cent. by Diseases of | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | The Epidemic Class. | Typhus. | The Nervous System. | The Respiratory System. | Phthisis. | The Digestive Organs. | Other classes. |
| 1 to 10 (mean) | 57 | 3.321 | .991 | .324 | .543 | .822 | .478 | .208 | .758 |
| 11 to 20 | 78 | 2.839 | .701 | .20 | .467 | .768 | .451 | .197 | .706 |
| 21 to 30 | 217 | 2.163 | .485 | .107 | .369 | .588 | .354 | .155 | .567 |

" The mortality then increases with the density, yet the densest districts are not invariably the most unhealthy.

| Unions or Districts. | Area in square yards to one person. | Annual rate of Mortality per cent. |
|---|---|---|
| " St James, City of London, Strand (mean), . . . . . | 24 | 2.1 |
| " Shoreditch, Bethnal Green, Bermondsey (mean), . . . | 60 | 3.1 |

" The necessary deduction from the double series of facts then is, that the mortality has a tendency to increase as the density of the population increases.

" The annual rate of mortality in some districts will be found to be 4 per cent., in others 2 per cent. ; in other words, the people in one set of circumstances live fifty years, while in another set of circumstances, which the registration will indicate, they do not live more than 25 years. In these wretched districts, nearly 8 per cent. are constantly sick, and the energy of the whole population is withered to the roots."

" The parishes in the neighbourhood of Whitechapel com-

pose the most unhealthy district in London, whilst the districts of Camberwell and Hackney, in the suburbs, are the most healthy; but the healthiest parish is that of St George, Hanover Square. In Whitechapel 39 out of 1000 die annually. In the parish of St George the proportion is only 17.

It appears that the crowding of cities doubles the mortality from epidemic, endemic, and contagious diseases, as also from diseases of the nervous system, the ratio of deaths having been as 1 to 2.11, and 1 to 2.13. The increase in the nervous diseases occurs chiefly in *water in the head* and convulsions. From convulsions the deaths in the counties were 1347; in the cities 3723, ratio 1: 2.76. From *hydrocephalus*, or water in the head, they were in the counties 559; in the cities 1540, ratio 1: 2.75. In inflammation of the lungs and *bronchi*, in the counties there were 1209 cases; in the cities 2865, ratio 1: 2.37.

" The three following diseases, which principally affect adults between the ages of 15 and 65, show that unhealthy places augment the fatality in different degrees:—

| | Counties. | Cities. | Increase per cent. in cities. |
|---|---|---|---|
| Deaths by Consumption | 5857 | 8125 | * |
| Childbirth, | 217 | 872 | * |
| Typhus, | 1567 | 3456 | * |

" This gives the classification a peculiar property. Wherever the absolute mortality is low, the number of deaths in the epidemic class is less than the number in the pulmonary class; and, on the contrary, wherever the deaths in the first class exceed or equal those in the third, it may be affirmed that the absolute mortality is high." The following remarks of Mr Farr regarding the most common causes of disease in large cities are very just:—

" The occupations in cities are not more laborious than agriculture, and the great mass of the town population have constant exercise and employment; their wages are higher, their dwellings as good, their clothing as warm, and their food certainly as substantial as that of the agri-

cultural labourer. The Poor Law Inquiry, and successive Parliamentary Committees, have shown that the families of agricultural labourers subsist upon a minimum of animal food, and an inadequate supply of bread and potatoes. The source of the higher mortality in cities is, therefore, in the insalubrity of the atmosphere.

"All gases and effluvia, like odours, are diffusible; they have a certain force of diffusion which Professor Graham has expressed numerically; and all the emanations from human habitations in the open country mingle, almost as soon as they escape, in the currents of the atmosphere. But locate, instead of one individual to a square mile of land (the supposed density of population in the uncultivated forests of America, and the steppes of Asia), 200,000 individuals upon a square mile, as soldiers in a camp, and the poison will be concentrated 200,000 fold; intersect the space in every direction by 10,000 high walls which overhang the narrow streets, shut out the sunlight, and intercept the movements of the atmosphere; let the rejected vegetables, the offal of slaughtered animals, the filth produced in every way, decay in the houses and courts, or stagnate in the wet streets; bury the dead in the midst of the living, and the atmosphere will be an active poison, which will destroy, as it did in London formerly, and as it does in Constantinople now, 5–7 per cent. of the inhabitants annually, and generate, when the temperature is high, recurring plagues, in which a fourth part of the entire population will perish. But the health will be little more impaired by residence upon one than upon one hundred square miles, if means can be devised for supplying 200,000 individuals with 200,000,000 cubic feet of pure air daily, and for removing the principal sources of poisonous exhalations. The latter object is partly accomplished by paved even streets, by the scavenger, by an abundant supply of water, by large well-constructed trapped sewers, and by domestic habits of cleanliness; but it is difficult to perceive how volatile impurities can be re-

moved, and how a stream of uncontaminated air can be supplied where the sun cannot heat the earth and air, where there are no open squares, or the streets are narrow, or the houses are only separated by courts, or built in *cul-de-sac.*

"It appears that the area of square miles in the metropolis, is 70; in the counties, 7,933. The estimated population, 1st October 1837, was, in the metropolis, 1,790,451; in the counties, 1,723,770. The population to a square mile, in the metropolis, 25,578; in the counties, 222. Let us look at the mortality:—

| | Metropolis. | Five Counties. |
|---|---|---|
| "Deaths, 1st July to 31st Dec. 1837, | 24,959 | 15,210 |
| " 1st Jan. to 30th June 1838, | 28,638 | 18,864 |
| | 53,597 | 34,074"* |

Mr Rickman, in his *Population Returns,* states that the crowding of people together in towns has a most decided influence in inducing bad health and disease. In London there are 171 families to every 100 houses, and the annual mortality is about 1 in 42. In Liverpool there are 131 families only to 100 houses, and the mortality is 1 in 52. Hull has 134 families to 100 houses, and the mortality is 1 in 49. In Bristol there are 131 families to 100 houses, and the mortality is 1 in 51. In Manchester there are only 116 families to 100 houses, and the mortality is so high as 1 in 30. In Birmingham there are so few as 105 families to 100 houses, and the mortality is 1 in 48. In Leeds there are 111 families to 100 houses, and the mortality is 1 in 48. But mark the following:—In Dublin there are 252 families to every 100 houses. In Edinburgh there are 310 families to every 100 houses. And in Paisley there are 360 families compressed into 100 houses. The rate of mortality in the three latter towns is not stated.

* Johnson's Medical Review; Report of the Registrar-General.

In glancing over these enumerations regarding the English cities, we readily perceive that the rate of mortality does not increase according to the excess of families to the fixed number of houses. In Manchester and Birmingham the number of families to every 100 houses is nearly the same, yet the rate of mortality of the former is fully one-third more than that of the latter. So the crowding together of families, though certainly by no means favourable to health, does not seem always to increase the general rate of mortality, or what would be the case in Edinburgh, Glasgow, Dublin, and Paisley? but the following quotation shows, that in some localities, it has a decided influence in this respect:—

"On comparing the deaths between the age of 20 and 50, in the division comprising the metropolis, with those comprising Hertfordshire, Bedfordshire, and Buckinghamshire, and the rural parts of Middlesex, it appears that in the former division the deaths between the ages of 20 and 50, out of 1000 at all ages, are 241, while in the latter they are only 192; from whence arises apparently an undeniable inference, that there is some cause operating in the metropolis, tending to cut short life when it has run through half its natural course, which does not equally affect it in the adjacent rural districts. But it appears from the enumeration made in 1821, that of 10,000 persons of both sexes then living in Middlesex, there were 4522 between the ages of 20 and 50, while the mean number of persons of the same age in Bedfordshire, Buckinghamshire, and Hertfordshire was 3581—a remarkable difference, attributable to the circumstance of persons born in the counties near London quitting them, as they emerge from childhood, to seek employment in the capital. There were thus 4522 persons exposed to the risk of death, between the ages of 20 and 50, in Middlesex, for 3581 in those three adjacent counties; and, if the mortality were equal, the deaths between those ages in Middlesex and in the other three counties ought to bear the same proportion.

Therefore, upon the supposition that the proportion of the living remains the same as in 1821, the results exhibited by the Abstracts of Deaths will not be unfavourable to the metropolis.

"Again, on comparing the proportion of deaths under five years of age, in the division comprising Lancashire, south of Morecambie Bay, with the exception of Manchester and Liverpool, with the same in the division comprising Herefordshire, Monmouthshire, and Wales, it appears that in the former division there were 458 deaths, and in the latter 365. But on referring to the table founded on the enumeration of 1821, it appears that out of 10,000 persons of each sex, in the county of Lancaster, exposed to the risk of death, under the age of five, there were 1711 males, and 1582 females: while in Hereford the proportion was only 1317 males, 1326 females; in Monmouthshire, 1320 males, 1404 females; in Wales (collectively), 1514 males, 1382 females. If, therefore, the proportion of the living at the above-mentioned age continued to be the same in the year ending June 1838, and the mortality at that early age were the same in both divisions, the proportion of deaths in the former division would of necessity be greater than in the latter."*

It also appears, from the same report, that the proportional mortality in the metropolis is considerably more than a third part higher than in an equal amount of population in some of the counties. The population of the metropolitan division, including Greenwich, was, in 1831, 1,594,890. Now, the population of the five counties, Cornwall, Somersetshire, Wiltshire, Dorsetshire, and Devonshire, was 1,599,024, which is pretty nearly the same. But the whole mortality in the metropolitan division was 24,959, whereas in the counties it was only 15,210; and, it farther appears, that the whole number of

* First Annual Report of the Registrar-General of England and Wales.

deaths in twenty-four city districts, including Manchester, Birmingham, Liverpool, and other large towns, were 22,994, whereas in the same amount of population extended over seven of the counties the number of deaths amounted only to 14,473.

Such statements show that the general rate of mortality of all ages increases with the density of the population, which is just what we should naturally expect; but from this it does not follow, from either one city or district being more densely populated than another, that the mortality in that particular city or district should be greater than that of others less densely populated. No; an excess of mortality in any district, however densely populated, depends as much on the individual conduct of the population as on the combination of those unavoidable circumstances in all large towns which give rise to insufficient ventilation and other causes of bad health. However, all things being considered, human life is much better in rural districts than in large towns. According to Dr Farr, in large cities, in a given amount of population, viz. three millions and a half, there are 137 deaths, whilst in rural districts with the same population there are only 100 deaths; so the mean duration of life is fully a third longer in the one case than in the other.

" There are particular diseases which are more frequent and fatal in towns than in the country. The following are examples :—

| | For the same Amount of Population, the mortality is— | |
|---|---|---|
| | In Counties. | In Cities. |
| Asthma, | 100 | 380 |
| Erysipelas, | 100 | 271 |
| Convulsions and teething, | 100 | 257 |
| Chephalitis and hydrocephalus, | 100 | 241 |
| Hydrophobia, | 100 | 237 |
| Pneumonia, bronchitis, and pleurisy, | 100 | 199 |
| Delirium tremens, | 100 | 198 |
| Typhus, | 100 | 188 |

| | For the same Amount of Population, the mortality is— | |
|---|---|---|
| | In Counties. | In Cities. |
| Smallpox, | 100 | 173 |
| Heart disease, | 100 | 173 |
| Childbirth, | 100 | 163 |
| Syphilis, | 100 | 159 |
| Rheumatism, | 100 | 158 |
| Gout, | 100 | 155 |
| Hernia, | 100 | 148 |
| Purpura, | 100 | 146 |
| Liver disease, | 100 | 145 |
| Consumption, | 100 | 124 |
| Croup, | 100 | 123 |

"Thus, among any equal number of persons living in a great town, and in the country, the probabilities are, that nearly four times as many will die of asthma in the former as in the latter. From erysipelas the deaths are nearly three times more numerous in towns. In childbirth the chances of death in towns are 63 per cent. greater than in the country."

In stone, apoplexy, paralysis, dropsy, jaundice, the difference is trifling, and in diabetes, cancer, atrophy, scrofula, the mortality is greater in counties than in cities. The comparison, however, must not be considered perfect, for the counties taken to represent the state of the population in the rural districts contain some considerable towns.

The great mortality of Manchester and other large manufacturing towns, is attributed to the employment of children in the factories at an early age. Such a system, undoubtedly, tends to increase the mortality, especially amongst the very young and the aged ; but it does not appear to increase it either in youth or in mature age, as will be seen from the statement of Dr Johns, as quoted in Chapter V., in the article on "Confinement and Insufficient Ventilation." Manchester, however, has always

been considered a very unhealthy place, from the general combination of those causes which universally lead to sickliness in all large manufacturing towns. The general causes of sickliness in large towns are insufficient ventilation—the absence of sufficient light, from the height of the houses or the narrowness of the streets—the accumulation of filth—the want of proper drainage by sewers—the want of personal cleanliness, salutary bodily exercise, and proper food. These, along with the want of public hospitals, and long hours of confinement in crowded apartments, are the chief causes of an excess of sickness and mortality, especially from fever, in large towns. Every sort of noxious effluvia has a tendency to favour the development of different diseases, but especially that of typhus fever. Mr Walker, in his "*Gatherings from Grave-Yards, London,*" states that typhus is very prevalent in the neighbourhood of the *Burying Ground, Portugal Street,* and especially in Clement's Lane, which is almost surrounded with burying-grounds. But, perhaps, nothing tends more to the development of fever in any community than a general want of cleanliness, along with a great amount of poverty; for, under depressed circumstances, people become desponding, and, consequently, become quite regardless of all those domestic duties by which human health and comfort are kept up. It is well known that fever generally originates with the poor, and the wretched, from the combination of all those depressing causes which render such individuals broken down both in body and mind. Their houses are filthy in the extreme, and they have neither sufficient clothing nor food to keep up their system, so as to enable it to perform those vital operations necessary to health. Thus situated, they become reduced both in their physical and mental attributes; and finally lie down, as it were, prostrate victims to want and disease. Under such circumstances, the misery accumulates—the contagious particles become disseminated in all contiguous directions—the predisposed

victims fall on every side before their depressing influences; and, in a very short time, a densely populated section of a lane, or street, becomes one living source of infectious poison. Such is merely a hint of what is common in the most of our large towns. From day to day funerals issue from our long dark dingy closes, and are generally accompanied with some of those funeral rites which constitute one of the decencies of life; but this is all: no means are taken either by the authorities, or by the better classes, to look into the real causes of all the misery. The people themselves are, no doubt, mostly to blame; but, for the sake of the general good, such things ought not to be allowed to pass unnoticed, and without any attempt to correct them.

In every large town the Police ought to have, and take, the entire management of the out-of-door *hygienic* operations. There ought to be a distinct and efficient board of *scavenger-police* to order and superintend the regular removal of every sort of accumulation which might tend, in the slightest, to give rise to noxious exhalations: and, if the proceeds arising from the manure purchases were not sufficient to meet the expenses of the board, a very light tax on every house in proportion to the rent would suffice for the whole. And, in the event of individuals infringing the orders of the police regarding their own private hygienic duties, a fine might be imposed. Even in the long closes of our large towns there are not, generally speaking, such a combination of insurmountable difficulties in way of cleanliness and ventilation, as to render these very desirable means of health available. If the people themselves would only spend one hour each day in cleaning their houses and staircases thoroughly, carefully scrubbing out every corner which might become dirty and damp, at the same time throwing out all dirty slops, and keeping their windows and doors open for a considerable part of the day in mild weather, and, in winter, during any convenient time, filth, squalid looks, bad health,

misery, disease, and even death itself, would, all in proportion, disappear.

Dr Cowan, in his Vital Statistics of Glasgow, very judiciously says, "Many of the causes of the production and propagation of fever must be ascribed to the habits of our population; to the total want of cleanliness among the lower orders of the community; to the absence of ventilation in the more densely peopled districts; and to the accumulation, for weeks or months together, of filth of every description, in our public and private dunghills; to the over-crowded state of the lodging-houses resorted to by the lowest classes; and to many of the circumstances unnecessary to mention."

In the country matters are very little better than in large towns. In villages there is a gross carelessness on the part of the community at large in respect to cleanliness, both in and out of doors. It is a very common thing to find dunghills against the very door-post, and a stagnant pool of *slush* all around, and such is too frequently the case about the cottages of farm servants, and also about secondary farm steadings. From such causes, along with domestic slovenliness, the writer has often witnessed as severe and melancholy consequences from typhus fever in individual families in the country, as he ever witnessed in the filthy closes and lanes of Glasgow. The writer could give many examples of the violation of domestic duties in the country, in one family alone being the means of spreading typhus fever through a considerable part of a village. In one instance, a fish-cadger had his family, his horse, and an immense quantity of fresh herrings for salting, all under one roof—the whole was one accumulation of stench and filth. Both he and his wife, along with some of the children, took typhus fever in consequence—they all recovered, but it spread through the village, and a good many died. Such are often the consequences of profligacy and filthy habits, respectable individuals subjected to all the sufferings arising in a family

from the propagation of a fatal disease by the carelessness and cupidity of worthless individuals.

Dr Cowan, after showing the alarming increase of the mortality of Glasgow in late years, says, very justly—"The lesson which it affords should not be lost, but should stimulate our civic rulers to the investigation of the causes which have produced such a frightful rate of mortality—a rate which, it is believed, is unequalled in any city in Britain." The same remark may be applied to almost every dense population in Scotland and Ireland, and even to the great majority of our rural populations. The *rural* police, now established in some of the counties in Scotland, might have their time very well filled up in looking after such matters. The *duties* of this class, in particular, are nothing more than a mere parade; and it is also very much the case with some of our town's police.

But nothing can contribute more to the safety of a community, against the spreading of disease, than the establishment of public hospitals and public charities. By such establishments, the propagation, both of disease and vice, is very much prevented, and many poor indigents are favoured with a house and a home, and with treatment calculated to relieve all their temporary sufferings. Since the influential and able in every community are becoming more and more alive to the benefits which arise from the establishment of clinical hospitals, these institutions are likely to become much more general. The necessity, however, of such establishments is positive proof of our small advancement toward moral rectitude, for if the people in general were cleanly and well-doing, few but the indigent aged would require the assistance of such charities. But as things are, these institutions must be deemed excellent in the extreme, both as regards the relief they afford to suffering humanity, and their beneficial effects in stemming the current of disease—thus diminishing very much the general amount of suffering and mortality.

The ancient, and still continued, practice of burying the dead in the midst of the living has only very recently been taken into consideration, regarding the pernicious effects which attend such a system. Mr Walker, surgeon, in his "*Gatherings from Grave Yards*," has shewn most distinctly, by his able researches on this subject, that the system is accompanied with the most deleterious influences on public health. To illustrate this, we will make a few quotations from the work.

In speaking of the unhealthy emanations from the different burying grounds of the metropolis, Mr Walker says of the *Burying Ground, Portugal Street*, that "the soil of this ground is saturated, absolutely saturated, with human putrescence. * * * * The effluvia from this ground, at certain periods, are so offensive, that persons living in Clement's Lane are compelled to keep their windows closed; the walls, even of the ground which adjoins the yards of those houses, are frequently seen reeking with fluid, which diffuses a most offensive smell."

*St Clement's Church, Strand.*—"There is a vault under this church called the '*Rector's Vault*,' the descent into which is in the aisle of the church, near the communion table, and when opened, the products of the decomposition of animal matter are so powerful, that lighted candles, passed through the opening into the vault, are instantly extinguished; the men at different times employed have not dared to descend into the vault until two or three days had elapsed after it had been opened, during which period the windows of the church also were opened to admit the perflation of air from the street to occupy the place of the gas emitted;—*thus a diluted poison* is given in exchange from the dead to the living, in one of the most frequented thoroughfares of the metropolis. The other vaults underneath the church are also much crowded with dead. From some cause, at present doubtful, these vaults were discovered to be on fire upwards of fifty years ago; they continued burning for some days, and many bodies were destroyed."

The water of a well at the side of the church became so completely impregnated with the putrifying matter from the burying ground, that it could not be used.

"*Buckingham Chapel*, situated in Palace Street, about three minutes' walk from Buckingham Palace. There are two vaults and a burying ground belonging to this chapel; one of the vaults is *underneath very large school-rooms, for boys and girls*, and the other is *underneath the chapel*; the entrance to these vaults is through a trap-door in the passage, dividing the school-rooms from the chapel; steps lead to the bottom of the building; on the right is the vault underneath the schools. When I visited this place, a body had recently been interred, and the effluvium from it was particularly annoying."

Mr Walker, in his work, adduces a great many cases to prove the dangerous and fatal effects which decayed animal matter produces upon the living body. He thinks that the two most dangerous stages of animal decomposition are—1st, in cases immediately after death, and, 2d, when complete putrefaction is going on.

The mixing up of these depots of the dead with the useful institutions of the living, shows a fearful want of knowledge or consideration on the part of man regarding those influences which operate for his own destruction. But it is most melancholy to reflect on the youth of our capital being *schooled* under all the pernicious emanations arising from decaying animal matter. The very thought of it is too much for our feelings. If the people, hitherto, had been at all acquainted with such facts, and had duly considered the subject, there is not the slightest doubt that such enormities would ever have been in existence. But such being the case, no time ought to be lost in doing away with the evils; every thing which tends in the slightest to induce bad health and disease ought to be done away with; such repositories of the dead ought to be venerably broken up, and their contents removed, as has been done in some of the burying-grounds in France: and the places, in cities, which presented once the

dreary spectacle of our last home, might either be converted into useful stores for merchandise, or into healthful enclosures, as public walks or gardens. No doubt the more sensitive of every community would shrink at the very idea of having the mortal remains of their forefathers dug up and removed from what was considered their last resting place ; but such considerations, however venerable they may appear, ought to be laid aside, when balanced against the weal of the living. Indeed, when the pernicious effects of the present custom of burying in the midst of large towns are so strikingly pourtrayed, and so forcibly shown to be an evil of no small magnitude, there is every reason to think that there will be some other system adopted. Even already the subject is becoming daily one of more interest, and there have been some movements of late in some of our cities regarding the urgent necessity of taking immediate steps for furthering the desired object. Although the sacred remains of the present burying grounds should not be removed, all future interment ought to be given up, and the grounds, though saturated, as they are at present, with animal matter, would soon become, in a great measure, comparatively innoxious.

*Domestic Causes of Death.*—Before the salutary influence of such means of improvement, as we have mentioned, can become apparent amongst the mass of the people, there must be a very great change indeed, both in the general and domestic conduct of the people themselves.

It is most revolting to human feeling to witness the state in which a great many of the working and particularly the labouring classes live. From morning to night many women of these classes will sit with the one hand over the other in the most slothful state amidst every sort of filth and confusion. Their houses are damp and ill smelled, merely from gross carelessness and laziness in not opening their windows—not that their houses are so very bad that they *cannot* be kept *sweet* and comfortable. Their beds are also damp and moulded, and exhale a heavy

odour which almost cuts the breath ; and every corner and every article of furniture is sticking with clammy dirt, exhaling as it were from every inch of surface a noxious effluvia little less deleterious to human health than the exhalation of the "Bon Upas" poison tree. It were a gross calumny if we were to charge our working classes, generally, with such slovenly conduct, for there are many, indeed we may say almost a majority of them, who keep their houses well, and also themselves and their children tidy and clean; but it cannot be denied that nearly the one-half are dirty beyond endurance, and thus too often bring upon themselves and every one connected with them the most virulent and fatal diseases. It must, however, be understood that these remarks are applied only to those people of Scotland to whom they are justly applicable, for the writer is conversant with such facts only in his own country, where he has indeed had ample opportunity of witnessing such scenes! scenes which have often made him regret that he ever entered a profession which obliged him to look upon such disgraceful conduct on the part of human beings. Neither man nor woman capable of working need hold up their face and ascribe it to poverty. No! poverty is not the chief cause, for dirt does not always abound where abject poverty is often too apparent otherwise; on the contrary, we often find very poor individuals and families very cleanly: it is profligacy of money, and idleness, which lead to such discomforts. Every person in this country may have plenty of water, which, in the most of instances, except for clothing, is quite sufficient of itself for cleaning, provided it be used in a way which conscience and common sense would dictate to; but, alas! laziness in many cases will scarcely admit of these two grand principles in human nature being kept in action, for in too many instances they are both stifled in the bud by the slovenly examples set before children by their parents. It may be laid down as a general rule that industrious well-doing cleanly parents,

have generally an industrious, a well-doing, and a cleanly family.

In the most of instances man has his health greatly in his own power; for even a moderate regard for the decencies of life is usually followed or rewarded by a fair share of health and comfort; but when men and women neglect themselves and their children, one and all of them are rendered doubly liable to disease and death. It may be said that typhus fever, and many other infectious diseases, generally originate in depots of poverty, profligacy, and filth; and every medical man can testify that under such circumstances the great majority of severe cases prove fatal. Indeed, the writer has often been convinced in his own mind of the impossibility of recovery under such circumstances, and has had his prognostication too truly verified in the fatal termination of those cases. Such are the consequences of gross infringement of the decencies of life—of slovenly neglect of those duties which every human being in civilized society ought to perform. If people were as much alive to the performance of their domestic duties, and to a becoming conduct in life, as they often are to those gratifications which pander only to their animal appetites and propensities, they would to a certainty be much more comfortable, healthy, and happy, and would very seldom be subjected either to the sweeping scourge of pestilence or to the direful effects of famine. Famine and pestilence usually accompany each other, and are very generally the consequence of all those moral outrages which degrade and disgrace human nature. In proof of the correctness of the above remarks, we will quote a short paragraph from Dr Cowan's Statistics of Fever. He says, "It has already been remarked that the increase of fever in Glasgow during the seven years prior to 1837 had taken place, not in years of famine or distress, but during a period of unexampled prosperity, when every individual able and willing to work was sure of steady and remunerating employment."

The chief causes of all continued or typhoid fevers spring from the habits of the people themselves; but no doubt they are greatly aggravated by limited means of sustenance and dense population.

*Religious Causes of Death.*—Religion, abstractly considered, and like every other institution, has frequently a direct influence in laying her devotees under the fatal influence of her mighty impulses. The weak minded and the nervous are often laid prostrate by religious doubts and religious melancholy; the highly imaginative, and venerative, often end their days in a madhouse from religious *mania* or mental derangement; and the diseased are often devoutly excited beyond the equilibrium of their vital tenure, being frequently hurried to that doom by those influences, which, under a salutary state of the system, might have proved their support and delight.

In every age, and in every civilized country, a spirit of persecution has existed amongst the zealous partizans of different systems of religion. The savage tribes have always been in the habit of sacrificing unfortunate victims, as a fulfilment of their religious rites, either to gain the favour or to appease the anger of their imaginary gods. Other more matured systems at one time authorised an exterminating persecution, in the burning and massacring of all other sects. Besides, religion has often been made the pretext for wielding the rapier, and for firing the fagot against very excellent men—having sometimes been uplifted against the man who dared to expound the laws of God—at others, against those individuals who conscientiously differed in their opinions regarding the moral and religious government of man. Religion has been made the cause of much bloodshed, and sacrifice of human feeling, and human life. In the different persecuting periods, popes, priests, and kings, and spiritual laymen, have all been linked together in the holy massacres. From such a combination sprung the INQUISITION, with all its fearful artillery of racking, cutting, piercing, and sawing engines

—engines which were to mangle those bodies the divine workmanship of the Creator, and to give rise to those sensations of torture, the very thought of which is enough to make human feeling shrink for ever from its own consciousness of existence. Yes, such were the inventions of *spiritual* men ; and such torturing engines were the workmanship of the pure and unspotted hands of holy monks and priests. Whilst these arch-fiends were thus preparing their hidden shafts of torture, they were at the sametime kindling the flames of enmity betwixt man and man. Monarchs were set against monarchs, and subjects were raised both against their sovereigns and against one another. In short, the greater part of Europe in those periods might be compared to one great bomb of rancorous and sanguinary feeling, ready to be let off, by the inflammatory anathemas of a sanguinary priesthood, against HERETICS of every denomination.

Dr Dick, in his Philosophy of Religion, says of the Inquisition, "This infamous tribunal is said to have caused, between the years 1481 and 1759, 34,658 persons to be burned alive ; and, between 1481 and 1808, to have sentenced 288,214 to the galleys, or to perpetual imprisonment.* In the *Auto* of Toledo, in February 1501, 67 women were delivered over to the flames for Jewish practices. The same punishment was inflicted on 900 females for being witches, in the Duchy of Lorraine, by one Inquisition alone. Under this accusation upwards of *thirty thousand women* have perished by the hands of the Inquisition.† Torquemada, that infernal Inquisitor of Spain, brought into the Inquisition, in the space of 14 years, no fewer than 80,000 persons, of whom 6000 were condemned to the flames and burned alive with the greatest pomp and exultation ; and of that vast number there was perhaps not a single person who was not more pure in religion, as well as morals, than their outrageous persecutor.‡ Has

* "Histoire Abregee de l' Inquisition. † The Inquisition Unmasked, by Antonis Puigblanch. ‡ Kaim's Sketches, vol. iv."

the Deity, then, whom the Inquisition professes to serve, such a voracious appetite for the blood of human victims?

"The numerous massacres which, in different ages, have taken place on account of religious opinions is another revolting trait in the character of the professed votaries of the Christian cause. Of these, the massacre of the Protestants in France, on the feast of St Bartholomew, on the 24th August 1572, was perhaps one of the most diabolical acts of perfidy, injustice, and cruelty, which have stained the character of our race. Everything was atrocious and horrible in this unexampled conspiracy and assassination—feelings of the most sacred nature were annihilated—religious zeal was changed into an impious fury. Under directions of the infamous Duke of Guise, the soldiers and the populace *en masse*, at the signal of the tolling of a bell, flew to arms, seizing every weapon that presented itself, and then rushing in crowds to every quarter of the city of Paris—no sound was heard but the horrible cry, *kill the Huguenots!* Every one suspected of being a Calvinist, without any distinction of rank, age, or sex, was indiscriminately massacred. The air resounded with the horrid cries and blasphemous imprecations of the murderers, the piercing shrieks of the wounded, and the groans of the dying. Headless trunks were every instant precipitated from the windows into the court-yards or the streets, the gateways were choked up with the bodies of the dead and dying, and the streets presented a spectacle of mangled limbs and of human bodies, dragged by their butchers in order to be thrown into the Seine. Palaces, hotels, and public buildings, were reeking with blood, the image of death and desolation reigned on every side, and under the most hideous appearances; and in all quarters carts were seen loaded with dead bodies destined to be cast into the river, whose waters were for several days sullied by tides of human gore. The infuriated assassins, urged on by the cry that 'It was the king's will that the very last of this race of vipers should be crushed and

killed,' became furious in the slaughter; in proof of which, one Cruce, a jeweller, displaying his naked and bloody arm, vaunted aloud that he had cut the throats of more than 400 Huguenots in one day. During this horrid period, every species of the most refined cruelty became exhausted; the weakness of infancy proved no impediment to the impulse of ferocity; children of ten years, exercising the first homicidal deed, were seen committing the most barbarous acts, and cutting the throats of infants in their swaddling clothes! The number of victims thus slaughtered in the city of Paris amounted to above six thousand; and in the provinces, at the same time, there perished about sixty thousand. And what is still more shocking, the news of this massacre were welcomed at Rome with the most lively transports of joy. The Cardinal of Lorraine gave a large reward to the courier, and interrogated him upon the subject in a manner that demonstrated he had been previously aware of the intended catastrophe. The cannons were fired, bonfires were kindled, and a solemn mass was celebrated, at which Pope Gregory XIII. assisted, with all the splendour which that court is accustomed to display on events of the most glorious and important consequence!"*

"The horrid practice of dragooning, which was used by papists for converting supposed heretics, was another melancholy example of religious cruelty and frenzy. In the reign of Louis XIV. of France, his troopers, soldiers, and dragoons, entered into the houses of the protestants, where they marred and defaced their household stuff, broke their looking-glasses, let their wine run about their cellars, threw about and trampled under foot their provisions, turned their dining-rooms into stables for their horses, and treated the owners with the highest indignation and

* "See a late publication entitled, 'Memoirs of Henry the Great, and of the Court of France during his Reign,' 2 vols. 8vo, in which is contained the fullest description of this massacre which has appeared in our language."

cruelty. They bound to posts mothers that gave suck, and let their sucking infants lie languishing in their sight for several days and nights, crying, mourning, and gasping for life. Some they bound before a great fire, and after they were half-roasted let them go—some they hung up by the hair, and some by the feet, in chimneys, and smoked them with wisps of wet hay till they were suffocated. Women and maids were hung up by their feet, and exposed stark naked to public view—some they cut and slashed with knives, and, after stripping them naked, stuck their bodies with pins and needles from head to foot, and, with red hot pincers, took hold of them by the nose and other parts of the body, and dragged them about the rooms till they made them promise to be Catholics, or till the cries of these miserable wretches, calling upon God for help, induced them to let them go. If any, to escape these barbarities, endeavoured to save themselves by flight, they pursued them into the fields and woods, where they shot at them as if they had been wild beasts, and prohibited them from departing the kingdom, upon pain of the galleys, the lash, and perpetual imprisonment. On such scenes of desolation and horror the popish clergy feasted their eyes, and made them only a matter of laughter and of sport.* What a striking contrast to the benevolence of the Deity, whom they impiously pretended to serve! Could a savage American have devised more barbarous and infernal cruelties?

"In the civil wars, on account of religion, which happened in France in the beginning of the 17th century, above a million of men lost their lives, and 9 cities, 400 villages, 2000 churches, 2000 monasteries, and 10,000 houses were burned or destroyed during their continuance, besides the many thousands of men, women, and children, that were cruelly butchered; and 15,000,000 livres were spent in carrying forward these slaughters and devas-

* "For a more particular account of such scenes, see Encyc. Brit., article Dragooning."

tations. It is said of Louis XIII., who carried on these wars, by one of his biographers and panegyrists, Madame de Motteville, that 'what gave him the greatest pleasure was his thought of driving heretics out of the kingdom, and thereby purging the different religions which corrupt and infest the church of God.'* In the Netherlands alone, from the time that the edict of Charles V. was promulgated against the Reformers, more than 100,000 persons were hanged, beheaded, buried alive, or burned, on account of religion. The prisons were crowded with supposed heretics, and the gibbet, the scaffold, and the stake, filled every heart with horror. The Duke of Alva, and his bloody tribunal, spread universal consternation through these provinces; and, though the blood of eighteen thousand persons, who, in five years, had been given up to the executioner for heresy, cried for vengeance on this persecutor and his adherents, yet they gloried in their cruelty. * * * * Even in our own island, the flames of religious persecution have sometimes raged with unrelenting fury. During two or three years of the short reign of Queen Mary, it was computed that 277 persons were committed to the flames, besides those who were punished by fines, confiscations, and imprisonments. Among those who suffered by fire were five bishops, twenty-one clergymen, eight lay gentlemen, and eighty-four tradesmen, one hundred husbandmen, fifty women, and four children; and a century and a half has scarcely elapsed since the presbyterians in Scotland were hunted across moors and mosses like partridges of the wilderness, slaughtered by bands of ruffian dragoons, and forced to seek their spiritual food in dens, and mountains, and forests, at the peril of their lives."†

In the ages of martyrdom what countless thousands have been massacred at the shrine of bloated hierarchies,

* "Motteville's Memoirs of Anne of Austria, vol. i., p. 28."

† Dick's Philosophy of Religion.

and all under the protestations of religion! But as these barbarous scenes were the result of ignorance, and as they are now effaced in the lapse of time, it is needless to dwell upon their horrid realities, for these have been sufficiently pourtrayed already in the most frightful and revolting representations.*

* See Fox's Book of Martyrs.

## CHAPTER VII.

On the Moral Causes of Premature Death, as arising from Irregular Living and Drunkenness, Insanity, Suicide, Illegitimate Births, and Infanticide.

*On Irregular Living and Drunkenness.*—The moral causes of premature death may be viewed as the most melancholy calamities which afflict mankind, seeing that they originate from those ills which prove the very bane of human existence.

*Syphilitic* diseases may be considered the most serious physical consequences of immoral conduct. Passing over the primary effects altogether, we have sufficient to bewail in the ravages of the disease upon the system at large. Individuals so circumstanced, besides undergoing much primary suffering, are frequently quite incapacitated either for pursuing the duties of life, or for enjoying those social and worldly pleasures which spring from the various associations of civilized society. In consequence of the general undermining effects of *syphilis,* the whole body becomes more or less changed. The equilibrium of the different functions is so destroyed, that irregular nervous and vascular action, with a depraved state of the whole system, is the general result. The soft solids become quite flaccid and changed, and take on a specific action and disease, as is outwardly manifested in copper-coloured blotches and troublesome ulcerations. The bones also become so affected, that their covering membrane, the *periosteum*, becomes inflamed, and too often those which are superficially situated are rendered *carious*, and thus diseased portions separate from the rest. Whilst the corporeal system is thus being taken down bit by bit, as it

were, by the fangs of a gnawing disease, the mental faculties are also suffering a similar dilapidation. General mental debility is the consequence, which frequently ends in *epilepsy*, *paralysis*, and other diseases arising from a broken down state of the system generally.

Whilst we have virulent diseases springing from gross immorality, we have also much misery, disease, and death arising from irregular living and drunkenness. The constant use of spirituous liquors always proves hurtful to the constitution, but particularly so when indulged in to excess. Perhaps a regular system of tippling is less injurious than occasional and heavy debauches. In the former mode of drinking, the system becomes gradually adapted to the effects of the spirit; but in the latter, at every excess, the whole of the vital functions are necessarily more or less changed, in consequence of the different organic and nervous actions of all the different organs being excessively stimulated. It is well understood that individuals much addicted to drinking very frequently die suddenly. This is particularly the case amongst the better classes of society, and it arises from their system being over full and over stimulated. Tradesmen who indulge in the habitual use of spirits seldom live to an advanced age. They do not stand disease well, being very apt to be cut off by an attack of fever, or any other severe complaint which comes to affect the system generally. In the case of accidents accompanied with serious injuries, drunkards seldom survive, as the injured parts generally take on the irritative kind of inflammation, which gives rise to a corresponding fever of the whole system, and which, in the most of cases, very soon proves fatal.

But even when spirituous and fermented liquors are used habitually, although not to any excess, their effects upon the system generally give rise to many organic diseases of the different vital organs. The constant use of wine and malt liquors gives rise to a morbid fulness of the whole system, which induces many diseases arising

from congestion and other states of particular organs, such as apoplexy, palsy, gout, *calculous* disorders, and dropsies, as arising from diseased states of the liver and kidneys. Frequent excesses, again, give rise to different affections of the digestive organs, as manifested in jaundice, dyspepsia, protracted diarrhœa, and dysentry, all of which are frequently only the symptoms of confirmed inflammation of the stomach and bowels, along with disease of the liver and the other abdominal viscera. Very great excesses in drinking spirits, particularly undiluted whisky, give rise to general nervousness, inflammation of the brain, sudden attacks of palsy, *delirium tremens*, or brain fever, commonly called *blue devils*, and very often to insanity in its wildest forms.

*Delirium Tremens* is perhaps one of the most affecting diseases incident to a human being. Behold an individual in the prime of life addicted to the excessive use of spirits. All of a sudden he becomes quite delirious and unmanageable—flies from all his acquaintances and dearest friends—conceives himself haunted by unearthly objects—every thing horrible to his frenetic imagination springs into view—the utmost terror is evinced in his maniacal countenance, and his lips and limbs tremble under every emotion of his over-excited brain. It may be that the disease subsides, either of itself or perhaps assisted by medical means; but confirmed mental derangement is frequently the consequence, and very often death itself.

*Spontaneous Combustion* is a most striking and awful termination to an intemperate life. Some poor lonely dissipated wretch has been living, perhaps, without the necessaries of life;—of a morning his remains are found in a half-consumed state—some parts of his body burned to ashes, and all the rest left a half-consumed and blackened mass. This combustion of the bodies of those who have been much addicted to drinking is supposed to arise from an inflammable gas which is generated in the body from the constant and excessive use of spirituous liquors, and

which takes fire spontaneously, and goes on burning until the whole or a considerable part of the body is partially consumed. Cases of this kind are not at all common, but they do occur from time to time. They are, perhaps, more common in France, and some other countries on the continent of Europe, than in Britain.

The following is an enumeration of the extraordinary conditions connected with *spontaneous human combustion* :—"Generally, those who have died by spontaneous combustion have indulged in excess of alcoholic liquors. The combustion is almost always general, but in some cases may be partial. It is rare amongst men ; the women have in almost every case been aged. The body and viscera have always been burnt, whilst the feet, hands, and top of the head, have almost always been preserved. Although it is known by experience that a very large quantity of wood is required to burn a corpse, this particular kind of incineration occurs without inflaming the most combustible substances of an ordinary kind near it. It has not been shown in any case that the presence of an inflamed body is necessary to commence this kind of combustion. Water, instead of extinguishing the flame, appears to give it more activity, and when the flame has disappeared the combustion proceeds within. They occur more frequently in winter than in summer. The cure of general combustion has never been effected, only of partial ones. Those to whom it has happened have experienced a sensation of strong internal heat. It is suddenly developed, and consumes the body in a few hours. Those parts which are not reached by the fire are affected with sphaceles (mortification.) A putrid degeneration ensues, which causes gangrene. The residue of this combustion is composed of greasy cinders, and an unctuous fatty matter, both having a fetid odour, which is perceived at a great distance."*

According to the *Registers* of England, males are more

* Glasgow Medical Examiner, April 1831 ; Bull Universe.

intemperate than females—the deaths of 70 males, and of 15 females only, being ascribed directly to intemperance. Besides, the deaths of 67 males, and only of 12 females, were ascribed to gout, and of 86 males, and 9 females, to *delirium tremens*, or brain fever from excessive drinking. But, according to the Report of the Registrar-General for 1839, the deaths of 125 males and 36 females arose directly from intemperance; and from *delirium tremens* there were 167 deaths of males and 15 of females. It is thought that the proportion of deaths, from the effects of excessive drinking, is much higher than the above both in Scotland and Ireland.

*Insanity.*—Although insanity cannot be always attributed to infringement of the natural and moral laws on the part of the individual affected, we will consider it as one of the moral causes of death, for in many cases it can be directly traced to such an origin. In the most of cases, however, insanity comes on suddenly, being generally excited by some deep impression made upon the brain or organ of mind. Those impressions which usually give rise to mental derangement may be produced from an over excitement of any of the passions, from too constant exertion or straining of the mental faculties on any particular subject, from emotions being excited, either from sanguine or desponding anticipations, or directly from those excesses which characterize vice and immorality. Thus, hope, fear, joy, grief, anger, excessive bodily pain, love, and hatred, may all give rise to mental derangement, either from a morbid excitement of the brain and nervous system, or from long continued exertion of the mental faculties. Sanguine or moody anticipations give rise to a peculiar state or condition of the organ of mind, which ultimately renders it susceptible of those morbid impressions which bring on either organic diseases of the brain, or such derangement of its functions as is usually denominated insanity. Again, immoral licenses very frequently bring on morbid changes of the structure of the brain,

which lead to complete idiotcy, and consequently to permanent mental derangement.

According to the tables of the insane, got up by M. Esquiral in 1835, it appears that more cases of insanity arise from moral than physical causes. In his table, which contains 1557 cases, 337 are attributed to constitutional or hereditary predisposition, 579 to infringement of the moral laws, from the influence of the passions or mental weaknesses, which, not to speak of the numerous cases which arise from disappointment, ambition, religion, and other moral causes, is certainly a very large proportion.

M. de Boismont, at a recent meeting of the Royal Academy of Paris, read a paper regarding his inquiries as to the number of insane persons in some of the principal cities of Europe, which certainly exhibits a melancholy proof of the increase of insanity.

| Cities. | Population. | Number of Insane. | Proportion. |
|---|---|---|---|
| London, | 1,400,000 | 7000 | 200 |
| Paris, | 890,000 | 4000 | 222 |
| Petersburgh, | 377,000 | 120 | 3133 |
| Naples, | 370,000 | 479 | 759 |
| Cairo, | 330,000 | 14 | 30,714 |
| Madrid, | 204,000 | 60 | 3350 |
| Rome, | 154,000 | 320 | 481 |
| Milan, | 151,000 | 618 | 242 |
| Turin, | 114,000 | 331 | 544 |
| Florence, | 80,000 | 236 | 338 |
| Dresden, | 70,000 | 150 | 466 |

It is generally thought that insanity increases with the progress of civilization and refinement; but if such were really the case, we would expect to find it most prevalent where these predominate most. Now, another table, given by M. de Boismont, shows that such is not the case, for the proportion appears to be greatest in Scotland and Norway—two countries which, generally speaking, certainly do not stand at the top of the list as to *over*-refinement.

And it has always been said that insanity prevails to a much greater extent in the United States than in any other country, but the following table, in respect to the State of New York, shows the contrary.

| | Population. | Number of Insane. | Proportion. |
|---|---|---|---|
| State of New York, | 1,617,500 | 2240 | 721 |
| England, | 12,700,000 | 16,222 | 783 |
| Scotland, | 2,093,500 | 3652 | 563 |
| Norway, | 1,051,300 | 1909 | 551 |
| France, | 32,000,000 | 32,000 | 1000 |
| Belgium, | 3,816,000 | 3763 | 1014 |
| Holland, | 2,302,000 | 2300 | 1046 |
| Italy, | 16,789,000 | 1441 | 4879 |
| Spain, | 4,085,000 | 569 | 7181 |

The proportion of lunatics in Scotland, it appears from the above table, is at least one-fifth more than in the State of New York, and in Norway the proportion is still higher; a circumstance rather difficult to account for, when we consider the unsophisticated habits of the Norwegians, and if we admit that refinement is one of the chief causes of mental derangement.

According to the above table, then, insanity is most prevalent in Norway, Scotland, England, and New York, a circumstance, reasoning *á priori*, we could not have expected. But such being the case, it shows that the causes of insanity cannot be always attributed to over-refinement and civilization. That these do sometimes give rise to the malady no one will deny; but the very circumstance of its being so prevalent in Scotland and Norway leads us to suspect other causes. The feverish thirst of ambition —the blighting influence of disappointment—domestic grievances—poverty—pecuniary losses—civil turmoils, and changes in the aspect of public affairs—misconceptions and terror regarding religious subjects—jealousy, envy, and constant anxiety, goaded on by hot stirring passions to enormous notions and conceptions—are the chief causes of insanity. However, all these causes will be very much

influenced by the *status* of the individual in society—by his manner of living and habits of pursuit—and, above all, by the natural conformation and development of his organ or organs of mind. An individual very talented in some particular capacity may turn out either "a genius or an idiot," just according to the collateral circumstances in which he may be placed, and by which he shall be chiefly influenced.

M. Desportes gives the following table of the most frequent exciting causes of insanity in the patients which came under his investigations:—

| *Predisposing Causes.* | Cases. | *Physical Causes.* | Cases. |
|---|---|---|---|
| Hereditary predisposition, | 736 | Congestions of the brain, | 656 |
| Defect of intellectual development, . . | 642 | Epilepsy and convulsions, | 492 |
| Premature or natural old age, | 752 | Female complaints, | 749 |
| *Moral Causes.* | | Abuse of spirituous liquors, . . . | 414 |
| Domestic distress, . | 392 | Poverty and destitution, | 109 |
| Reverses of fortune, . | 150 | Syphilitic disease, . | 51 |
| Ambition, . . . | 139 | Misconduct & debauchery, | 216* |
| Disappointed love, . | 114 | | |
| Fright, . . . | 124 | | |
| Unknown causes, . | 1576 | | |

The following table, deduced from the Reports of the Bicetre and Salpetriere Asylums, gives the most frequent causes of insanity in both sexes:—

| | Men. | Women. |
|---|---|---|
| Insanity in consequence of other Diseases, | 236 | 998 |
| from Immoral Conduct, . | 52 | 101 |
| Ambition, . . | 134 | — |
| Religion, . . . | 54 | 30 |
| Love, . . . | 76 | 18 |
| Misfortune, . . | 122 | 87 |
| Chagrin, . . . | 115 | 107 |
| Political Events, . | 78 | — |
| Fright, . . . | — | 44 |
| | 867 | 1385 * |

* The above tables are taken from Dr Johnson's Medical Journal, Oct. 1837, April 1838.

† Hawkins' Statistics; Recherces, M. de Chubral 1826.

It appears, then, that insanity is very frequently the result of immorality, and that, consequently, it ought to be ranked as one of the moral causes of premature death. But it is certainly one which demands much sympathy, and ought to be always considered as the most melancholy termination of vice which frail humanity is heir to.

*Mortality of the Insane.*—M. Desportes, in his Reports of the Salpetriere and Bicetre Asylums, gives the following table, regarding the patients of these hospitals, which shows the number admitted, discharged, and cured, in the course of nine years, from 1825 to 1833 inclusive :

| | Lunatics. |
|---|---|
| Admitted, | 8272 |
| Discharged Cured, | 2763 |
| not Cured, | 1863 |
| Dead, | 3854 |

This table presents a very great proportion of deaths amongst the insane—being much greater than in any other general disease. October is the most favourable month for curing lunatics, and there are always more cures effected about the change of the seasons; so natural, as well as artificial, changes tend to the cure of insanity.

According to hospital reports the mortality of the insane is much greater amongst males than females; being, reckoned by M. Desportes, as about 6 to 10—a circumstance quite explicable from the known causes of the malady as affecting both sexes. In the male, insanity very frequently either arises from, or induces, disease of the brain. Whilst in females it is very frequently the result of extreme nervous excitement.

In the Paris asylums, the proportion of deaths from disease of the brain is very great. The reports for 1822, 1823, and 1824, give the following proportion :—

| | |
|---|---|
| Death from organic disease of the brain and membranes, | 418 |
| Death from various diseases, | 673 |
| Total, | 1091 |

The following table, compiled by Dr Burrows from the works of different writers on insanity, shows the proportional number of fatal cases of insanity in which there existed diseases of the brain and of other organs. The cases comprise 259 *maniacs* who were examined after death:—

"*Lesions of the Brain.*

| | | |
|---|---|---|
| Apoplexy, . . . . . . | 27 | |
| Organic Lesion (or disease) of the substance of the brain, | 19 | |
| Organic Chronic Lesion of the membranes, . | 22 | |
| | | — 68 |

"*Lesions of other Organs.*

| | | |
|---|---|---|
| Chronic Peripneumonia (Inflammation of the Lungs), | 20 | |
| Phthisis (Consumption of the Lungs), . . | 22 | |
| Chronic Peritonitis (Inflammation of the Bowels), | 9 | |
| Chronic Pleuritis (Inflammation in the Chest), . | 7 | |
| Chronic Inflammation of the Digestive Canal, . | 50 | |
| Other Organic Lesions of the *Bowels*, . . | 13 | |
| Lesions of the Liver, . . . . | 5 | |
| Lesions of the Kidneys, . . . . | 3 | |
| Of other Organs, . . . . | 6 | |
| | | —135 |
| | | 203 |

"In the other fifty-six corpses there was no visible evidence of disease in any of the viscera of the three great cavities! The spinal chord was examined in only two cases.

"From these dissections it follows:—1. That lesions of the brain, the organ of the intellectual functions, are in the proportion of one to two of those of the other viscera. 2. That more than *one* in *five* corpses of maniacs present no evidence of any disease whatever! 3. That in a great majority of cases the insanity was a sympathetic affection. And, 4. That, as more than a fifth of 259 dissections no lesion or alteration could be detected, it strongly corroborates the opinion, that, when such lesions or alterations are observed, they are posterior and not anterior to the development of the mental derangement.

"From whatever predisponent cause insanity may proceed, if it be not primarily an organic affection of the brain, it ends in being so. This seems demonstrated by the facility of its cure at the beginning of an attack of mania, comparatively with the attempt made at a more protracted period."*

In the Glasgow Lunatic Asylum the most frequent causes of death amongst the insane are—apoplexy, palsy, *atrophy*, and dropsies. Similiar observations have been made regarding a great many of our provincial asylums, all showing that organic disease of the brain is either a very common cause, or termination, of insanity.

Sir W. Ellis says, "of 154 male patients, 145 had disease very strongly marked either in the brain or its membranes. The other nine died of other diseases, two of which were idiots. Of 67 females, 62 were found with disease of the brain and membranes." This statement is certainly at variance with the opinions of many other writers on insanity, and particularly with those of Esquirol; but as the greater part of these cases given by Sir W. Ellis would be of the poorest and most miserable class, the proportional number of cases accompanied with actual disease of the brain would be great; for organic disease of the brain is more likely to supervene in the poor and ill fed, than in the affluent or the middle classes of patients.

According to the Reports of the Bicetre and Salpetriere, during the three years ending with 1834, the proportion of deaths, to all those admitted, was, in males, 25 to 100; in females, 19 to 100—in both the sexes 22 in 100.

In the Senavra Hospital at Milan, a great proportion of the patients are of the very poorest description, and the mortality amongst them is very great. But the poor about Milan are generally very unhealthy, being subject to a particular disease called *pellagra*, supposed to arise from the influence of the swampy grounds in the neighbour-

* Burrows' Commentaries on Insanity, p.p. 75–76.

hood, and which is considered a frequent cause of insanity in those districts.

*Table of Cases.*

| | | |
|---|---|---|
| Proportion of males to females, | | 87 to 100 |
| | Cured, | 57 to 59 |
| | Dying, | 40 to 45 |
| Proportion of cures to admissions, | | 58 to 100 |
| Proportion of deaths to admissions, | | 42 to 100* |

In the Senavra Hospital there are more female than male patients; but the mortality seems to be greatest amongst the males. The mortality amongst the whole is certainly very large, being nearly one half!

Sir W. Ellis says, "there are in England 12,668 pauper lunatics, and the insane alone, including the different classes of society, cannot be estimated at fewer than 10,000." According to this estimation, then, there are, in round numbers, about 23,000 insane individuals in England.

In London, according to the General Bill of Mortality, from Dec. 15, 1835, to Dec. 15, 1836, the number of deaths, from insanity, was 226. This does not include suicides, a great number of which might arise from mental derangement. At a very moderate calculation, the whole number of deaths from insanity, in London, may be reckoned at 400; and throughout the whole of England the number cannot be less than 1,500. In Scotland and Norway the proportion must be still higher.

"In February 1833, 393 lunatics were under the Court of Chancery at a cost of £350 per annum. Their estates averaged £650."†

The above quotation will give the reader some idea of the prevalence of insanity amongst the better and higher classes; and it is certainly a very humiliating picture of

* Hawkins' Statistics; Burrows' Commentaries.

† Million of Facts.

the pernicious effects of many absurd customs in life, and of the melancholy consequences of moral degradation from infringement of the natural and moral laws. But such conduct is not confined to any one class. We see individuals, in the meanest walks of life, vilely profligate, both of their means of health and of subsistence; which conduct too often induces insanity or idiocy, either in themselves or in their descendants: thus punishing *many* generations, from individual cupidity and ignorance respecting those divine laws which were intended to regulate human nature.

*Suicide.*—Although suicide is often the result of insanity, it generally arises from violent mental distress brought on by worldly grievances, which again are often the direct consequences of infringement of those moral and natural laws, the observance of which is absolutely necessary for the well-being of every individual. So long as the established customs of society are found to harmonize with the good intentions and feelings of the people at large, they ought to be withheld, because they operate for the general good, and consequently for the advantage of the many. Their influence over the mind of the people may be termed the great incentive to virtuous actions, which actions are undoubtedly the equipoise to mental activity. For want of such adjugate mental co-operation, individuals are often driven to the most distressing and most melancholy act which man can be guilty of, namely, self-destruction.

In England, in cases of suicide, the coroner generally gives a modified verdict, in reference to the crime having been an act of temporary mental derangement; which is certainly the most feeling, and, at the sametime, the most summary, way of settling the case, both as affecting relatives and the public, and which, under all the distressing circumstances that generally attend such cases, is very humane policy indeed. In the most of cases of suicide it would be very difficult to come to any other

conclusion, excepting in those testified to the contrary by a memorial of the deceased, the soundness, or not, of which would be the best criterion of the state of the individual's mind when the deed was committed. We are inclined to think that the act of suicide is not positive proof of the individual having been *insane*; for a person may be as sane in committing such a deed, as in doing any other premeditated act; for example, as in committing murder under such circumstances as would inevitably lead to discovery. In both cases the deed is very similar, being that of irresistible determination for a specific purpose or end.

Mr Forbes Winslow, in his "Anatomy of Suicide," advocates the doctrine, that this deed is generally to be attributed to insanity. He says, "very few cases of suicide take place in which you cannot trace the existence of previous mental depression, produced either by physical or moral agents. It may be said that lowness of spirits is not insanity—certainly not, according to the *legal* definition of the term; but we may always be assured, that if mental anxiety or perturbation be more than commensurate with the exciting cause, it may be presumed that the individual is labouring under the incipient indications of insanity."* Every individual has experienced lowness of spirits from some cause or other, sometimes from worldly grievances and bodily suffering, at other times from altered states in the electrical condition of the atmosphere. Now if, under such circumstances, an individual, in his own hearing, were seriously charged as being insane, would he not naturally arouse himself from his mental torpor, and show his insane philosophising accusers that his lowness of spirits could no more be considered an indication of temporary insanity, than their own curious conjectures regarding such. If lowness of spirits, or mental perturbation, can be traced to specific causes, it will always be found that such exist in a greater or less degree according to the mental peculi-

* Op. Cit., p. 229.

arities of the individual; and, although they may be excited, or exist to a greater extent in some individuals than in others, still they must just be regarded as degrees of mental depression, or of excitement. In insanity a person thinks and acts from uncontrollable and morbid impulses, arising from the lost balance of his intellectual faculties; but, in lowness of spirits, an individual's mind may be quite harmonious in all its actions, whether perceptive or imaginary. We must look, then, amongst the fatalities of worldly concerns for the incentives to suicide, for assuredly their potential influence is at once the predisposing and exciting cause to self-destruction. Suicide is generally committed with the view of getting quit of some insupportable grievances—some calamities, either apparent or real, too great for the individual to meet with any prospect of overcoming in a satisfactory manner according to his excited views.

From the reports published in the French Journals we are apt to think that France, at the present time, is the country which might be styled the "land of suicide;" but we shall afterwards see that such is not the case, for the crime is much more common in England and Prussia, and throughout the most of the United States; but it is a melancholy fact, that suicide is very much on the increase throughout France, and particularly in Paris, as the following table from the unpublished discourse of M. Dupin shows:—

| | | |
|---|---|---|
| In 1830 there were in Paris | 269 | Suicides. |
| 1831 | 377 | |
| 1832 | 369 | |
| 1833 | 338 | |
| 1834 | 436 | |
| 1835 | 477 | |

The above numbers of suicides in Paris represent a ratio of one in every one hundred deaths. Scarcely a day passes over the heads of the gay Parisians, without some of their "*jeunes gens*" consigning themselves in all their

*gaieté de cœur* to that indelible doom, self-destruction. Nay, in France the vice seems to be very often the result of mere childish caprice, or premature *courage sans peur*, either regarding present or ultimate consequences. The French medical journals present us from day to day with many melancholy cases of suicide amongst very young persons.

A boy, 12 years of age, hanged himself in his bedroom, with a handkerchief from a nail in the wall, *though his feet had rested on the floor*. The cause assigned for the deed was, that, for accidentally breaking his father's watch, he was shut up in his room, and allowed nothing but dry bread. He was said to be a very intelligent and gentle boy in the games with his companions.

Another boy, only 11 years of age, after being reproved by his father for leaving him in the fields, went home, put on his holiday clothes, and hung himself from the cross-beam of his bed. He had written on the wall with charcoal the following words:—" O, s'adieu de Francois Benjamin Ricard, qui s'est pendre atacher au Rido de sa mere." At his feet was found a bottle of holy water, and he had marked on the wall opposite three figures of the crucifix.

A boy, 13 years of age, having been struck by his father for some misdemeanour, told his companions that he intended to drown himself:—" Jai frappé par mon pere, il ne recommencera plus; je vais me jeter a l'eau." His companions laughed at this language, but he drowned himself that very afternoon.

Two girls, one 11 the other 13 years of age, who had some quarrel with their parents, threw themselves into the Seine, but, as the water was not deep, they were saved by some workmen.*

It is a singular fact that suicide is very often committed through the influence of *imitation*. The effects of bad example are well known regarding many other

* Medico-Chirurgical Review; Gazetta de Hopitaux.

vices; but we would be slow to suspect its ascendancy in self-destruction. However, such seems to be really the case. Castel intimated to the French Academy of Medicine that "a soldier at the Hotel of Invalids, hung himself on a post, and was shortly afterwards *imitated* by twelve other individuals; but that the disposition ceased on the removal of the fatal post. Dr Burrows relates some similar instances. Primrose relates that the women of Lyons were seized with a propensity to commit suicide by throwing themselves into the wells of that city.

In 1813, in the little village of St Pierre Monjau, in the Valais, one woman hung herself; many others followed her example, and if it had not been for the interposition of the authorities, the contagion might have spread. At the meeting of the French Academy alluded to above, Esquirol related six cases occurring of persons being seized with the propensity to destroy their children since the trial of Madame Cornie for that crime.*

According to Dr Falret—"The entire number of suicides entered by the police at Paris during the 30 years from 1794 to 1823 was 6,782. Of these 4,720 were accomplished—two-thirds were of the male sex. The average number for each of the ten years, commencing from 1794, was only 107; but for each of the ten years ending in 1823, the average was so great as 334.

"Not quite a third of the whole number were *married:* of this married third 960 were men and 735 women.

"As to the age of suicides, we are surprised by finding that 181 were below the age of 15, and that 497 were between 15 and 20. The period of life which affords the largest list is between 35 and 45. Drowning was the mode of death most frequently chosen; the second is by fire-arms; and next follow in succession, precipitation, strangling, cutting or pointed instruments, the vapour of charcoal, and, lastly, poison. It must be admitted that a

* Hawkins; Burrows' Commentaries.

considerable number of those enrolled as suicides, fall rather within the philosophical than the popular acceptation of that term, since many owed their end to drunkenness, and other physical causes.

" The moral causes entered on the police registers are instructive, in the light which they throw upon national character. Amongst them are enumerated, of

| | | | | |
|---|---|---|---|---|
| Unfortunate love, | 254 | instances, | of which | 157 were females. |
| Jealousy and envy, | 92 | ,, | ,, | 53 ,, |
| Wounded self-love, | 53 | ,, | ,, | equal in both sexes. |
| Dishonour & calumny, | 125 | ,, | ,, | 97 male. |
| Remorse, | 49 | ,, | ,, | 37 ,, |
| Disappointed ambition | 122 | ,, | ,, | 110 ,, |
| Reverse of fortune, | 322 | ,, | ,, | 283 ,, |
| Gaming, . . | 155 | ,, | ,, | 141 ,, |
| Other misconduct, | 287 | ,, | ,, | 208 ,, |
| Domestic chagrin, | 728 | ,, | ,, | 524 ,, |
| Misery, . . | 905 | ,, | ,, | 511 ,, |
| Fanaticism, . . | 16 | ,, | ,, | 1 ,, |
| Misanthropy, . | 3 | ,, | ,, | 3 ,, |

The results of these tables are favourable to the character of the female sex; and not least is the circumstance, that, of 1758 instances, where causes are not assigned by the police (from ignorance or from a prudent silence) belonged to males.

September was the month most prolific of suicide. March and October approach most nearly to it. January, February, December, and November fall greatly below them in number. The five months of spring and summer, between March and September, are, upon the whole, the most productive seasons of the year.* This agrees with the observations of Dr Farr: he says, that suicides are most frequent in the Spring quarter and fewest in Winter.

The following table, from the Report of the Registrar-

* Hawkins' Statistics; Rapport sur le Prix de Statisque decerne par l' Acad. Roy. des Sciences pour l' Annsè, 1827.

General of England and Wales, shows the ages of forty-four suicides :—

| Age, . . | 10–20 | 20–30 | 30–40 | 40–50 | 50–60 | 60–70 | 70–80 | All Ages. |
|---|---|---|---|---|---|---|---|---|
| Males, | 1 | 5 | 0 | 3 | 4 | 1 | 0 | 14 |
| Females, | 5 | 7 | 2 | 3 | 8 | 3 | 2 | 30 |
| Both Sexes, | 6 | 12 | 2 | 6 | 12 | 4 | 2 | 44 |

According to Dr Farr, the tendency to commit suicide increases up to the age of 60. He calculates, that of 1,000,000 persons living at each of the following ages the tendency to the act is as follows :—

| | | | | | |
|---|---|---|---|---|---|
| At the ages from | 10 to 15 | there occur | in every | 1,000,000 | 4 suicides. |
| ,, | 15 to 20 | ,, | ,, | ,, | 47 |
| ,, | 20 to 30 | ,, | ,, | ,, | 62 |
| ,, | 30 to 40 | ,, | ,, | ,, | 93 |
| ,, | 40 to 50 | ,, | ,, | ,, | 149 |
| ,, | 50 to 60 | ,, | ,, | ,, | 206 |
| ,, | 60 to 70 | ,, | ,, | ,, | 198 |
| ,, | 70 to 80 | ,, | ,, | ,, | 152 |
| ,, | 80 to 90 | ,, | ,, | ,, | 143 |

Mr Forbes Winslow has been at great pains in extracting from the works of Pinel, Esquirol, Falret, Foderè, Arntzenius, Schlegel, Burrows, Haslam, and other writers on insanity and suicide, the particular appearances which have been noticed after death in 1333 cases of persons who have committed suicide :—

| | | | |
|---|---|---|---|
| Thickness of cranium, . | 150 | Disease of stomach, . . | 100 |
| No apparent struct. change, | 100 | Disease of intestines, . . | 50 |
| Bony excrescences, . . | 50 | Disease of liver, . . . | 80 |
| Tumors in brain, . . . | 10 | Suppressed natural secretions | 15 |
| Simple congestion, . . | 300 | Disease of heart, . . . | 10 |
| Disease of membranes, . | 170 | Syphilitic disease, . . . | 8 |
| Disease of lungs, . . . | 100 | | |
| Softening of brain, . . | 100 | Total, . . . | 1333 |
| Appearances of inflammation in brain, . . . . . | 90 | | |

"Accretions of the membranes of the brain are often found in suicides. The dura mater is often ossified, and the pià mater inflamed, and the orachnoid thickened. Osiander considers congestions of the vessels of the brain a frequent cause of suicide."* This opinion of Osiander's is likely to be correct; for, as suicide is generally committed under great mental depression, conjoined with low nervous and vascular energy, the vessels of the brain, it is but reasonable to suppose, must be more or less in a state of congestion.

According to M. Guerry, the number of suicides registered in France from the year 1827 to 1830 was 6900. The actual amount must even be greater, as a great many cases would not be registered.

In order to show the comparative prevalence of suicide in different countries, we will have to draw again upon Dr Hawkins. We will quote the talented author's own words:—

"It is well known that a coroner and jury are summoned to investigate every suicide which occurs in Westminster. Mr Higgs, the Coroner of the City of Westminster, made, in 1825, a report of the suicides committed in Westminster during the thirteen years previous. In order to furnish every means of comparison we must premise that the population of Westminster, according to the census of 1821, was 182,444. We may add, for the use of strangers, that it is the centre of dissipation for the whole empire. During the thirteen years from 1812 to 1824, the total number of suicides was only 290, a number which, if trebled, would be inferior in proportion to the returns made by the great cities of France and Germany.

The number of males in this table is 207, of females only 83, which is a proportion of 5 to 2. The *Novembers* of these thirteen years produce only 22, while the rate of the *Junes* is 34. In the years 1812, 1815, 1820,

* Anatomy of Suicide.

and 1824, November did not afford one suicide. The least prolific months were May and September, next August and October, and then November. During the latter eight years, a reduction occurred on the average of nearly six per annum. The annual average is a little more than twenty-two during the whole term. From motives of humanity the juries gave a verdict of *insanity* in all but five instances. In 1825, a year marked by commercial distresses, the total number was 24, of these * * one man cut his throat through jealousy, eight poisoned themselves, and eight were found hanging.

The annual number returned by the bills of mortality for London usually ranges between 30 and 50. After making every allowance, we may estimate the number of suicides annually accomplished in London and Westminster at about 100. In England and France a majority of the victims appear to be *unmarried*. In France, the proportion of married men to single amongst suicides has been rated as only 2 to 3. *

" Other countries certainly present a darker picture. We are not surprised at finding the number 1300 recorded for Versailles in 1793, a year of political storm and of dreadful anticipation to its inhabitants. In 1806, Falret asserts that the suicides of Rouen amounted to 60 during the months of June and July alone. Professor Grohmann notes a remarkable increase at Hamburgh :—In 1816 the number was only 2, in 1820 it rose to 10, and 1822 produced so many as 59. In the small district of Frankfort-on-the-Maine the number in 1823 was 100.

"In 1806, there were 300 at Copenhagen—of late years the annual average has been 100 in 100,000 inhabitants, and in Paris 49. The increase in Prussia, and especially in Berlin, is extraordinary. In the seventeen years following 1758, the proportion at Berlin was 1 suicide in 1800 deaths. But in the ten years following 1787 the

* "Dict. Sciences Medic., art. Celibat."

proportion is seen to double itself, becoming one in 900 deaths. In the ten years following 1798 it is trebled, and in the ten years ending in 1822 it arose to the formidable height of one in every 100 deaths. These numbers, large as is their amount, do not include many who are found drowned in the river, and whose fate is dubious. In 1817 the proportion for the whole Prussian nation was one in every 400 deaths. We must remark, upon the comparative frequency of this crime amongst *boys* in France and Germany. We should not venture to state the curious fact of the existence of a *suicide club* in Prussia except on the authority of Dr Casper, an eminent statistical writer in Berlin, a city where every work is submitted to the *censure.* This club consisted of six persons, who avowed openly their intention of destroying themselves, and endeavoured to gain proselytes. Their absurdity excited more laughter than belief, but three instances occurred of conformity to principle, and, at last, all the six evinced their sincerity—the last shot himself in 1817." *

"In Berlin suicide is most prevalent amongst weavers and soldiers. It is much more common among the females of Paris than among those of Berlin, in a twofold average —a fact that might be anticipated from the more retired and unambitious path of the German woman. During six recent years, 18 cases of suicide happened at Berlin, under the age of puberty, and eleven men above 70. So far more numerous are the civic than the rural cases in Prussia, that while the proportion in towns is 14 in every 100,000 inhabitants, the country exhibits only four in the same number. This crime appears to find very few victims in Spain. In the whole of that country only sixteen instances are officially reported to have occurred in the year 1826. In all Sweden there were only 153 suicides in the year 1823. In four years (1823–4–5–6) 4087 suicides took place in Russia." † In Naples, during the

* Elements of Medical Statistics.

† Medico-Chirurgical Review; Hawkins' Statistics.

year 1836, in a population of 357,283, there were only 31 cases of suicide. In St Petersburg, in the years 1831–2 and 3, there were only 104, which is only about 34 annually, and these occurred chiefly amongst the lower classes of society. The crime seems to be rather prevalent in Bohemia. In 1835 there were 119,483 deaths, of these 186 were suicides, which is about one in every 600. In Lower Austria, from the 1st November 1835 to the end of October 1836, the deaths amounted to 49,556, the suicides to 109, which is about one in every 457.*

According to Dr Graves of Dublin, Ireland is the least suicidal nation in Europe. He says that an Irishman very seldom thinks of killing himself, however prone he may be to kill others.

Dublin and Naples are the two cities in which the fewest cases of suicide occur—a circumstance which appears at first sight rather singular, when we consider the wretched condition of the poor in both of these cities. But it appears that the very poor are not the most apt to commit suicide—they seem rivetted to each other by sheer force of *natural* relationship, they have no overstretched thoughts beyond the means of keeping "soul and body" together; therefore, all their mental operations are chiefly directed to that end, which entirely averts any thoughts dangerous to life itself.

In the department of the Seine (Paris), between 1817 and 1825, the suicides averaged annually one in 2400 inhabitants; in Berlin from 1813 to 1822, one in 2941; in Geneva from 1820 to 1826, one in 3900; and, in London, one in 5000 inhabitants.

The proportion of suicides in large cities is much greater than in the country. In London there are about one hundred and twenty-six suicides annually to every million inhabitants; whereas, in the south-east counties of

* British and Foreign Medical Review, No. VII., and London Medical and Surgical Journal, July 1837; Wildberg's Jahrbuch d. ges. S. A. 3 B. 2 h. 1837.

England, there are only from 45 to 72. In Wales the proportion is so low as 25.*

Dr Graves says "there are forty murders in Ireland for one in Prussia, and in Prussia forty suicides for one in Ireland." In these two countries, then, we have destruction of life from human violence in an equal ratio—an Irishman cuts the throat of his neighbour but holds his own life sacred—a Prussian's conscience or rectitude stays his hand from injuring his fellow; but in his mind there does not reside the same principle against pointing the dagger to himself. Such differences in national character and national propensities are certainly striking; but the great difference in the principal religions of the two nations will account for it to a certain extent. A Roman Catholic has no consolation in death without *absolution*, a rite the suicide cannot obtain. The Lutheran Protestant and the Calvinist may have his doubts and fears as to the crime of self-destruction, but even under these his hopes may be such as to carry him beyond their influence of restraint. Dr Graves says, also, that for one suicide in London there are five in Paris. He thinks that irritation is the chief cause of suicide, and that industrious and prudent people very seldom commit this crime, for he mentions, that, of 120,000 who insured their lives in the Equitable Insurance Office, not more than 15 of these committed suicide. The Jews very seldom commit suicide.†

According to Dr Farr, there are more than double the number of suicides amongst males than females, the proportion being as 76 to 31, which undoubtedly arises from the latter not being so much exposed to the irritating and bitter jarrings of life—their habits of living being more retired, and consequently of a more equable tenor. But when women step beyond the precincts of domestic duties, they also become entangled in the embitterments of life,

* Appendix to the Report of the Registrar-General.

† Dr Graves' Lectures; London Medical and Surgical Journal.

and consequently become the unsuspicious victims of those tyrant powers which too often prompt to self-destruction. The French females, perhaps more so than those of any other nation, participate more in the fluctuant state, both of popular and political feeling, than seems consistent with the wellbeing of the female character : hence the frequency of female suicide in France.

The Countess of Blessington, in *The Idler in Italy*, thus beautifully describes the difference of the French and English character :—" The French women are very pleasant companions—so easily amused, and so naturally disposed to be amusing. They have more animal spirits than the English, but it never degenerates into aught approaching to boisterousness. But this extreme facility of pleasing and being pleased argues a want of that sensibility which renders English women so captivating. A French woman seems born to amuse, and to be admired ; an English woman to interest, and to be loved. A man must have a more than common share of vanity who could imagine that a French woman, however she might profess to like him, would break her heart at his loss. She is too *spirituelle*, too vivacious, and too prone to be diverted, to indulge a settled melancholy ; but an English woman, with her naturally soft and reflective character, her power of concentration, and the gentle pensiveness which is a characteristic of her countrywomen, conveys an impression that her happiness would be for ever destroyed by the loss of the object of her affection ; and this impression has a powerful impression over him who loves her. From what I have seen of French women, I can believe them capable of the most heroic sacrifices, the most generous and noble actions ; but, I think, they would like an audience to applaud the performance of their parts. I cannot picture to myself a French woman passing months in a sick chamber, noiselessly gliding to perform those duties which are so admirably fulfilled by English women. No, she presents herself to my imagination brilliant and elegant,

happy in the consciousness of being *mise dans la derniere mode*, content with her *modiste*, her *couturiere*, and herself, and, *par consequence*, with all the world. The English woman is, by nature, timid, and doubtful of the effect she produces. She thinks more of the object she wishes to please than of the means used to accomplish this desideratum. She is afraid *la derniere mode* may not suit her as well as it does others; she has *not* an implicit confidence in her *modiste* and *couturiere*, and still less in herself: hence she wants that *air degagé*, that sparkling animation, which appertains to the French woman, and which is founded on the unshakeable basis of her vanity."

Suicide is very common in the army, the proportion being as 1 to every 28 of the deaths, which is more than five times the amount of the greatest ratio in civil life. In the Prussian army, about 1-20th of the deaths occur from suicide. The frequency of suicide in military life may be accounted for in many ways. Soldiers are very strictly tied down to their onerous duties—duties which are often both very humiliating and revolting, and which they cannot get quit of in the course of their service, and which, consequently, must be borne with through the greater part of their lifetime, in the gloomy and depressing prospect of being released, at some distant period, either by death or a discharge. It is not surprising that the human mind, under such circumstances, should resolve on its own termination, and at once put a period to its miserable consciousness of existence.

But the great proportional mortality in the army from suicide may be also partly owing to soldiers being mostly of that age in which the crime is most frequently committed; for suicide is seldom committed either among the young or the aged, being in the great majority of cases confined to the mature epochs of life. The soldier's *trade* will also make him regardless of the preservation of life, and will thus make him less mindful about self-destruction.

The following table, according to Quetelet, shows the proportion of suicides in different countries to the population, and also the relative proportion in the dragoon-guards and dragoons of the United Kingdom :—

| | | | | | |
|---|---|---|---|---|---|
| " In France there is | 1 | suicide | annually to | 18,000 | inhabitants. |
| Prussia, . . | 1 | ,, | ,, | 14,404 | ,, |
| Austria, . | 1 | ,, | ,, | 20,900 | ,, |
| Russia, . . | 1 | ,, | ,, | 49,182 | ,, |
| State of New York, | 1 | ,, | ,, | 7,797 | ,, |
| State of Boston, | 1 | ,, | ,, | 12,500 | ,, |
| State of Baltimore, | 1 | ,, | ,, | 13,656 | ,, |
| State of Philadelphia, | 1 | ,, | ,, | 15,875 | ,, |
| Dragoon-guards and dragoons of the Unit. Kingdom, | 1 | ,, | ,, | 1,274 | |
| The department of the Seine, including Paris, between 1817 & 1825, | 1 | suicide | in | 2,400 | ,, |
| Berlin, ,, 1813 & 1832, | | ,, | in | 2,941 | ,, |
| Geneva, ,, 1820 & 1826, | | ,, | in | 3,900 | ,, |
| London, ,, | | ,, | in | 5,000 | ,, |

" It appears from these numbers, that suicide is at the rate of four times at least more frequent among the dragoon-guards and the dragoons than in civil life in this country, and very nearly twice as frequent as it is in Paris. It is also much more frequent than among the troops generally."

From all the foregoing statements, the reader will be led to think that suicide is much more common in France than in England ; but Dr Farr, in his appendix to the Registrar-General's Report, shows that such is not the case. In 1838, there were, in England and Wales, 1044 suicides, which is about 1 to every 15,320 of the population. In the four years from 1827 to 1830 there were, in France, 6900 suicides, which is 1750 annually, or 1 to every 17,150 of the population, which is pretty near the proportion given by Quetelet in the above table. According to these statements, the proportion of suicides to the natural mortality of the two countries is still greater in

England than in France. In the former, there is 1 suicide to every 340 deaths—in the latter, only 1 to every 472. From these numerical statements given by Dr Farr, we are led to conclude that suicide is *more common* in England than in France, a circumstance not generally thought of.

From what can be learned of the general causes of suicide, we are inclined to believe that it usually arises from *bitter feeling*, or from dreadful anticipations engendered by an over-anxious and excitable mind; for, in the most of instances, it seems to be committed with the express intention of getting quit of some insupportable grievance. Every individual, when weighed down with mental distress, longs for that relief which promises some remission of his sufferings. But what can

> ———"minister to a mind diseased,
> Pluck from the memory a rooted sorrow,
> Raze out the written troubles of the brain,
> And, with some sweet oblivious antidote,
> Cleanse the stuff'd bosom of that perilous stuff
> Which weighs upon the heart?"

To a mind in such a state, death seems the only antidote, and it thus seeks relief of its present sufferings in the oblivion of their causes—anticipating a happier state of being consistent either with its natural or religious views regarding a future state.

Is the desire of life not the strongest passion in every individual? What a fearful perturbation, then, must that mind be in, respecting the present, the past, and perhaps the future, which is about to direct an instrument against itself. To cut that sacred thread, once preserved with all that peculiar tenacity inherent in every living being—to destroy that instinctive principle of self-preservation, which seems interwoven with the very tissue, if we may use the expression, of life itself.

Suicide, in the most of cases, appears to be an act di-

rected by reason—a determined revolt of the mind, from certain painful occurrences, against those principles which sustain the sense of existence to a state of things quite incompatible with human happiness. It seems to be committed purely from selfish motives—from an irresistible desire to get quit of those miseries apparently too heavy for the individual's faculties to bear or to overcome.

> "Faults in the life breed errors in the brain,
> And these reciprocally those again."

*Illegitimate Births and Infanticide.*—The mortality amongst illegitimate children, as might be expected, is much greater than amongst those born in wedlock. The parents of illegitimate children are, generally speaking, not so careful of their offspring. They often try every shift to get quit of their infant, and when they have not the pecuniary means of doing so, *in an honourable way*, the poor *innocent* often falls a victim to undue exposure, or direct murder. Such crimes may be generally attributed to unprincipled fathers; for when an *unfortunate* mother has not the means of providing for her infant, she is often distracted through shame, and disgrace, and want; she is generally looked down upon by all her relations and acquaintances; and is, consequently, driven to extremes in all her ways of thinking. Under these trying circumstances, the mother desires to get quit of her child, in order that she may be the more able to provide for herself; and also, often from the supposition that its absence may be conducive to wiping away the stain from her character.

A mother may attempt to get quit of her illegitimate offspring either by forcing the father to take it, by sending it out to strange nursing, by secretly exposing it, or, if the child's birth has been concealed, by murdering it, for infanticide is not often attempted in cases where the birth is known.

All infants suffer more or less from being taken away

from their mother; and they always suffer much from undue exposure. Besides suffering from strangers' milk, they are not so much cared for, either one way or another, and are, consequently, much more liable to all the diseases which too often prove fatal to infants, even under the most favourable circumstances. Observation and experience teach us that a very great proportion of the children, sent out to nurse, get diseased and die. According to the reports of foundling hospitals, the mortality amongst the children has been very great.

When foundling hospitals were first established, they were conducted in a very different way from what they are now. At first it was intended that all the infants admitted should be kept within the precincts of the hospital; but such a system was found to be very destructive to the children—indeed, the mortality was truly appalling. In the Dublin Foundling Hospital, to which there is an infirmary attached for the treatment of the sick children, in the 21 years ending with 1796, 10,272 sick children were admitted, and out of that number only 45 recovered! At the Foundling Hospital at Vienna, according to the average published in 1810, more than one-half of the children died. At the Foundling Hospitals of Petersburgh and Moscow, of 37,000 children admitted in 20 years, 35,000 died. In the Province of Archangel, in 1812, of 417 foundlings, 377 of them were swept off the first year. At Barcelona, in 1821, the fifth part of all the children born was abandoned to the Foundling Hospital: 463 were admitted during the year, and 437 died! During the year 1823, 597 foundlings were received at the hospital at Palermo, and 429 died, or 72 per cent!*

Such is an extract of the mortality of foundling hospitals, where the children were nursed and brought up chiefly within the walls; and, consequently, subjected to all the pernicious influences of bad air, artificial nursing, and an

* Hawkins' Medical Statistics.

almost unavoidable want of cleanliness. But now the foundling hospitals are conducted on a different system entirely. They are used only as receiving houses or depots. The children are received under every emergency, consistent with the rules of the establishment, and are properly taken care of until suitable out-door nurses be provided. And as women in the country are generally preferred, the children have a much better chance of being well looked after, and, consequently, of surviving the critical period of infancy.

The Foundling Hospital of London is conducted in the most judicious manner; but, as an indiscriminate admission of children is not allowed, the number received is perhaps small for such an extensive city. The regulations of the hospital are eminently calculated to discourage vice; whilst sufficient relief is afforded to all those whose case seems to demand the extension of sympathy and charity. There are generally from three to four hundred children in the hospital, and upwards of a hundred in the country at the nursing. The following statements from Dr Hawkins' work show the great advantages resulting from this improved system of management. The mortality, which was formerly so great in the Dublin Hospital, is now very much diminished. From June 1805 to June 1806, 2168 infants were taken into the house, and only 486 died there—a very small proportion for that period. "From 1800 to 1811, 11,111 infants were brought in by distressed parents, and 14,974 were abandoned. But it must be remembered, to the credit of Dublin, that its Foundling Hospital is not at all confined to the city, but receives inmates equally from every part of Ireland, and even several from England, since this is the only hospital in the United Kingdom which receives any infant left at the door without inquiry. The exertions made to instruct the children, as they advance, in useful arts, and the general attention paid to their education appears to distinguish this establishment very honourably."

"In Edinburgh, an attempt has been occasionally made to form a foundling hospital, but has failed from the opinion of its injury to morality.

"The number of children abandoned by their parents at Paris, in 1827, amounted to 8084.

"In every hospital, where foundlings are indiscriminately received, the mortality seems to be beyond the control of all attention or skill. In Paris, at present, of 1000 foundlings admitted, 251 are ascertained to die during the first few days, and 235 more on their road to the country nurses, or before the end of the first year; so that at that period only half remains alive.

"Since the practice of sending infants to the country was commenced in the Foundling Hospital at Vienna, the deaths have diminished from 1 in 2 to 1 in $4\frac{1}{2}$."*

Such are a few convincing proofs of the great mortality amongst infants when abandoned by their mothers. And if foundling hospitals and other charities were not provided for the reception of illegitimate infants, in all probability the crime of infanticide might be much more common than it is; at all events the exposure of children would be attended by even a greater mortality.

*Infanticide.*—Among the ancient Persians, Dr Hawkins says, it was a common custom to bury children alive. In most of the Grecian states infanticide was not only permitted, but actually enforced by the law. Of all the nations of antiquity, the Romans were most unrelenting in their treatment of infants. The law of the Twelve Tables sanctioned this barbarous practice, and such was the custom of Rome from her first origin to the time of Constantine. Christianity first opposed a barrier to the crime. The Phœnicians and the Carthaginians were no strangers to it. At a later period, traces are visible in the history of the Vesigoths. The Chinese are notorious for cruelty in the exposure and murder of their children. This habit

* Dr Hawkins' Elements of Medical Statistics, chap. viii.

was among the Hindoos until lately still more prevalent. The number of infants murdered in the provinces of Cutch and Gazerat alone amounted, according to the lowest computation, to 3000 annually. Within a few years, through the benevolent exertions of England, infanticide has been completely abolished in many parts of India.

Mr Malthus says of the wretched inhabitants of Terra del Fuego :—" If the mother of a sucking child die, the helpless infant is buried alive in the same grave with its mother. The father himself places his living child on the body of his dead wife, and, having thrown a large stone upon it, the grave is instantly filled up by the other natives."

In some of the South Sea Islands infanticide is practised in a regular systematic way. In Otaheite, a set called Earowies, who have formed themselves into a kind of society, and which consists of parents of the higher classes, are bound to destroy all their children. " When an Earowie woman is delivered of a child, a piece of cloth, dipped in water, is applied to the mouth and nose, which suffocates it."* In Otaheite, and the most of the South Sea Islands, two-thirds of the children born are destroyed. As we cannot extend our observations to the inhuman practices of all the different savage countries respecting the treatment of their offspring, we must refer the reader for further accounts to the work of Mr Malthus on population.

Infanticide is by no means common in London, or in any part of Great Britain or Ireland. It is said to be very common in Spain, along with the exposure of infants. The crime will always diminish in proportion to the increasing *knowledge* and morality of the people.

* Cook's Third Voyage, vol. ii. p. 158.

# CHAPTER VIII.

On the Mean Duration and Expectation of Life—On the Principles of Population and Mortality—And on Marriage, Lactation, and Medicine, in relation to Population and Mortality.

*On the Mean Duration and Expectation of Life.*—As comprising the whole human race, *the mean duration of life* signifies the average life of mankind, or the period or number of years which individuals on an average enjoy, taking one life with another; *i. e.* the mean of all the lives taken together as terminating at all the different ages. Dr Casper has calculated the mean duration of life of the whole human race to be about 33 years. *The expectation of life*, in reference to individuals of any age, signifies the chance which any person of a given age has of surviving a certain number of years, which period or number of years is termed the *probability* or *expectation* of life which individuals on an average enjoy, as calculated from any given ages. For example, according to the law of mortality at Carlisle, the expectation of life to an individual of 20 years of age is about 41½ years; to an individual of 50 it is about 21 years; and the mean of all the ages taken together shows the *mean duration of life* of all those individuals whose lives have been made the subject of observation. *The expectation* of life has been estimated in different ways, and is shown by the Mortality Tables, which represent *the average duration of life attained by individuals of all ages*. But, of course, some individuals have a much better prospect of long life than others, in consequence of their possessing both a stronger constitution and better general health; so the expectation of life to

any individual depends very much upon his constitution, and hereditary peculiarities, of body. The Mortality Tables present different results according to the particular constructions of those tables. There are in England the Carlisle Tables, formed by Mr Milne, from the observations of Dr Hesham, on the mortality of that town in the years 1779–1787. The Northampton Tables, by Dr Price, the Amicable, by Mr Finlayson, the Equitable, and the Government Tables, all of which represent the results of pretty extensive investigations regarding the laws of mortality in their respective classes of individuals. As the Carlisle Tables are considered the best as to the fair laws of mortality, we will ground the following general considerations upon them.

One set of the Carlisle Tables give the proportional numbers that arrive at certain ages out of a given number born:—For example, of 10,000 born, 4,397 reach their fiftieth year, 3,643 their sixtieth, and so on. These are termed the tables of *the living*. Another set of these tables show the average number of years enjoyed by individuals of all ages: thus, opposite to the ages 50 and 60, there are marked 21.11 and 14.34, which signifies, that individuals aged 50, on an average, live 21.11 years more; and that those aged 60 live on an average 14.34 years more. These are termed the tables of *mean duration*. The first set of these tables, then, represent the numbers who live to certain ages out of a given number born, and are the tables of *the living*. The second represent the average number of years enjoyed by individuals of all ages, and are the tables of *the mean duration of life*, generally known as *expectation of life*, or the number of years an individual may expect to live.

*The mean duration of life*, in a given number of individuals, can only be correctly ascertained by proximate calculations relative to the number given, and the ages to which the different individuals attain; but, as such calcu-

lations are rather tedious, it is, according to Mr Morgan, found pretty correctly by the following rule:—

*Rule.*—" To find the mean duration of life from a table of the living at every age, out of a given number born, add together the numbers in the table for all the ages above the given age, divide by the number at the given age, and add half a year to the result." *

The expectation, or mean duration of life, as already stated, taken in a general sense, signifies the probable life of mankind, taking one with another: individually applied, it signifies the expectation or chance of a single life; or, in other words, the number of years, or time, which an individual may expect to live. But the reader is not to suppose, from the former statement, that the age to which *half the number born* attain, is the mean duration of life; for, according to the Carlisle tables, the mean duration of life is 41 years, and these tables also represent that of 10,000 born, 5009, which is fully the one-half, attain the age of 41 years: but, observe, the great difference which exists in France—of 10,000 born, not more than 5000 reach the age of 25 years. Now, the mean duration of life in England and Wales is reckoned at 41 years; in France it is reckoned at $33\frac{1}{3}$ years only.

In every population in which there is an excess of births, the mean duration of life will be shortened in a corresponding ratio; because the mortality is greater in early life than in any other period; consequently, the more children born the greater the general mortality, and the shorter the mean duration of life. But, notwithstanding this, if the number of births exceed that of the deaths, and if the country or place be salubrious, and the general conduct of the people conducive to health, the general mortality will accordingly decrease, and the mean duration of life increase.

In any community, then, in which the births are in ex-

* De Morgan on Probabilities.

cess, the proportional mortality ought to be less, *ceteris paribus*, than in one with a smaller proportion of births; but it does not follow that the mean duration of life should be greater in the former than in the latter, because the proportional mortality *in all the different ages* may be just as great in the one case as in the other. For example, in some of the northern states of America, into which there has been a great influx of young and healthy immigrants, the proportional mortality may be less than in some of the older ones, but the mean duration of life for all the different ages may be much the same in both; for, if the states be about equal in point of salubrity, all the individuals of the same age will enjoy about the same mean term or expectation of life in the two states respectively; and, therefore, the mean duration of life in reference to all the ages taken together shall be the same in both.

When the mean term of life in a community is long, and the proportional number of births and deaths small, the population is neither often renewed nor rapidly increased. The reverse is the case when the mean duration is short, and the births and deaths numerous. England and France may be taken as examples.

In both countries there are about 3.8 children born to every marriage, or 19 to every 5 marriages. In England the annual mortality may be estimated at 1 in about every 45 individuals, and the births at about 1 to 35 on the population. In France they are as 1 to 39, and 1 to 25 respectively. France, therefore, has both a greater proportion of births and deaths, and her *mean duration* of life is also much less than that of England. It follows, then, that France must both renew her population oftener, and also increase it by a greater number of marriages, because her average proportion of births to each marriage is just the same as that of England. The increase of the population of France, then, is chiefly from her numerous marriages, for her amount of immigration and emigration is perhaps very similar to that of England. But the popula-

tion in France is on the increase notwithstanding her mean duration of life being so small, and her proportional mortality so large. From 1829 to 1832 it increased $\frac{3}{4}$ of a million. The increase in England and Wales from 1821 to 1831, was 1,918,312. The population of France was 32,560,000, that of England and Wales 13,900,000. The *ratio* of increase in England is, therefore, much greater than that of France.

The births for 1831 in England and Wales were 392,000, which, divided by 3.8, the average number of births to every marriage, gives 103,158 marriages, being 134.8th of the gross population which marries annually. In France, the ratio of marriages, calculated from the number of births, is about 127th of the whole population; the proportion of births to the population is, therefore, much higher than in England and Wales, and, consequently, makes up for the greater mortality. The average proportion of the births to the deaths in England and Wales, at the present time, is reckoned to be as 28 to 20 in 1000 of the population, respectively; so, at this rate, the population of England must increase very fast. Now, as the population in every community is chiefly kept up by the births, it follows that the annual number of births in the whole population should give the mean duration of life. In England and Wales, the population (13,900,000), divided by 392,000 (the number of births), gives $35\frac{1}{2}$ years only as the mean duration of life, but the truth may lie between that and 41 years.

As the number of births measures the mean duration of life, it also measures the average length of *a generation;* because, every generation being the produce of the preceding generation, the annual number of births into the years of a generation gives the amount of the whole population as made up of all ages: so, according to the above estimations, the length of a generation in England and Wales is $35\frac{1}{2}$ years, or the same as the mean duration of life; but the correctness of this calculation will, of course, de-

pend upon the accuracy of the returns, both of the amount of the population and of the births. As there exists some ambiguity regarding the length of time denoted by the term *generation*, it may be proper to state that the length of any particular generations must vary according to the longevity of the individuals whose lives compose those generations. According to M. Vilot, the keeper of the Archives of France, the length of a generation in the male sex, among the upper classes of the Parisians, whose family records have been preserved, is just about $33\frac{1}{2}$ years, which accords with the general opinion that there are, upon an average, three generations in a century. The length of *male* generations, as calculated by M. Vilot, are reckoned by the period betwixt the birth of the father and that of the eldest son. So the average length of a generation in France, as in England, approaches pretty nearly to the *mean duration* of life throughout the whole country. In the greater part of Europe *the mean duration of life* may be estimated at about 30 years, and the average length of every generation about the same. The average length of the generations in any country, therefore, may be pretty correctly ascertained by simple reference to the estimated mean duration of life.

M. Quetelet has estimated the length of a generation, as deduced from the lives of both sexes in Belgium, at 40 years; but this estimate is allowed to be too high. It is somewhat singular that the length of a generation should have been estimated at about $33\frac{1}{2}$ years by Herodotus, a famous historian of Halicarnassus in Carea, who, in treating of the kings of Egypt, says, "three hundred generations make six thousand years, for three generations are equivalent to one hundred years." So the length of a generation of the Egyptians, as estimated by Herodotus, is just about the same as that of the French at the present time, estimated by M. Vilot.

But the length of a generation, as calculated from the lives of the upper classes by M. Vilot, can, of course, only

be taken as indicative of the duration of life in that particular class; for every different class of individuals, and even different families, will have a length of generation, or, in other words, have an expectation of life, corresponding in the one case to the general influences of civilized habits and employments, and in the other to the hereditary temperament and constitution. We have seen that people are long or short lived according to their habits and employments; and we have hazarded the opinion, that the expectation of life is better in some temperaments than in others; so each family, or class of individuals, give rise to a length of generation corresponding to their longevity.

*On the Principles of Population and Mortality.*— Every population is composed of individuals of all ages, but there are some populations which contain a greater proportion of some ages than of others. In every old country, the proportion of old and young depends chiefly on the salubrity of the climate, and upon the various influences arising from the customs of society. In a population which exists much by itself, there will be an almost uniform reproduction and decay; but in one which participates much either in emigration or immigration, there will be a corresponding fluctuation, affecting the particular classes and ages which may be most concerned in it. A country which sends out many emigrants suffers in its population from losing a great proportion of its mature ages,—being drained of its most useful and productive individuals; of those who have been brought up at its expense, and who have not wrought sufficiently long to liquidate the value of the labour and time spent upon them in their youth: and, for the same reasons, but of course taken conversely, a country which receives a great many mature emigrants is very much enriched by their productive labour. A country, such as France, or Britain, from which there is a great amount of emigration and into which there is little productive immigration, has to keep up and increase her population by frequent marrying,

which gives rise to a disproportionate number of the young, and consequently to an overwhelming amount of disease and mortality. In short, the population of such a country is a nursery, kept up by the strenuous efforts of the mature ages, for enriching others, by sending into them a great proportion of her productive individuals. It may be said that the population in every old country is too abundant, and that emigration relieves it of its superfluous numbers. It doubtless does relieve it of a certain amount of its numbers, but, as we said above, it is of the most valuable portion. Now, a population which is gradually increasing, either by numerous births or young immigrants, will always have a greater proportion of young persons than one which is stationary, and, consequently, will have both an excess of births and deaths. But the circumstance of the population increasing proves that the births and immigrations together exceed the deaths; and that, consequently, the proportional mortality will be less in a ratio corresponding to the increase.

In every population which is very fluctuating, the proportional mortality is, of necessity, high, because it has to renew its numbers frequently; so in a population which is not fluctuating, the proportional mortality is less, because it does not require to renew its population so often: in a population, therefore, which is not often renewed, the duration of life will be long. In other words, when a population is not often renewed, individual life is long and *vice versa*. Now, if laws were adopted to regulate the marriages of a country, her population might be kept in a condition calculated to promote her general interests; but since there exist no such laws, a population, under flourishing circumstances, may outgrow itself, and thus become greatly embarrassed. Hitherto Great Britain has been in a very flourishing state; she has for half a century back been increasing very fast in population, and also in all those agricultural and manufacturing improvements which are absolutely necessary for the support of that

increase; but, as it has from time to time been quite impossible to find a sufficient outlet for her rapidly manufactured products, many of her matured and over-abundant population, for want of employment, have been obliged to emigrate to other countries, where their skill and ingenuity are now working to the same general results as those which have happened to the *mother country*. Such enterprise must find its limits in every country, and, perhaps, these have been found already in Britain; for, unless population go on increasing in other countries in which there is little manufacture, and from which the present manufacturing countries can look forward to for a demand, it is quite impossible that either population or manufacture can increase in these countries in the same ratio as they have done for some years past.

The chief object of every population ought to be a strict regard to the absolute number of individuals required. An over amount of population is not less destructive to human life and comfort than the maintenance of a number of useless or superfluous animals would be off a limited supply of food, allowed to any party of individuals as the quantity absolutely necessary for the preservation of their health and life. A redundancy of individuals in a family, under limited means of living, necessarily gives rise to much misery, disease, and death; and too great an amount of individuals, or families, in any community, under similar circumstances, just gives rise to the same consequences, for every scarcity of labour and provision gives rise to bad health and disease, and, consequently, to an increase of the general rate of mortality.

The average number of births to every marriage, and the proportional number of marriages to the population, are the regular data, in civilized countries, for estimating the procreative power of increase in a population: but, before a correct estimation can be made, the exact number of outgoers and incomers would require to be known. From this *corollary* springs the following axiom:—

*Births and immigration increase a population: deaths and emigration decrease a population.*

We will briefly illustrate this. In 1831, the population of England and Wales was estimated at 13,900,000, the medium of which during the previous ten years might be about 13,000,000. The annual number of deaths was 245,770. The births were 392,013, which exceeds the deaths by 146,243. But the estimated increase of the whole population for 1831 was 191,851, which is 45,608 more than the excess of the births above the deaths. This great disparity in the numbers may be partly accounted for from a great number of the births not having been registered; for errors are more likely to occur respecting the registration of the births than that of the deaths; because, with the exception of drowning and concealed murders, every person is likely to be buried in a regular way, and registered accordingly, whilst many hundreds of families under the old system of registration never registered their births at all. But it is allowed that the population returns previous to 1801 were too low; and that, consequently, the three increases for 1811, 1821, 1831 were overrated by 25 per cent. The increases at the above-mentioned periods were 1,277,635, 1,828,260, and 1,918,212; so 25 per cent. off these for one year is 41,868, which, deducted from one year's increase, say that of 1831, leaves just 149,983 as the real annual increase of the population, and which accords pretty nearly with the excess of births; making allowance, of course, for non-registered ones and the influx of strangers. But the population of England and Wales would certainly have increased more than this only for the extensive emigration; for between 1821 and 1831 not fewer than 50,000 emigrated annually, which amount would have been the source of a considerable increase, for the greater part of that number would be individuals chiefly in the prime of life.

*The Increase of Population* is a subject which has attracted a considerable share of attention in all ages. The

ancients viewed it as one of the greatest boons; but the most of the moderns have looked upon it as an appalling evil. According to Montesquieu, the ancients actually made laws to favour or encourage the propagation of the species. In more recent times such enactments have not only been considered unnecessary; but the natural tendency to the increase of population, itself, has been viewed by Malthus and his followers as the very means which might ultimately bring about the total destruction of the human race!

Mr Malthus says—"The cause to which I allude is the constant tendency in all animated life to increase beyond the nourishment prepared for it." It is upon this "*tendency*," which exists in every increasing population according to the "*ratio*" or rate of its increase, that Mr Malthus grounded his favourite theory. After making some statements regarding the amount of "the germs" of animal and vegetable life which *might* be generated in the world, and regarding the necessary *checks* which keep these down, he proceeds with his theory. He says, "In the back settlements of the northern states of America, where the sole employment is agriculture, and vicious customs and unwholesome occupations are little known, the population has been found to double itself in fifteen years. Even this extraordinary rate of increase is probably short of the utmost power of (increase of) population. Very severe labour is requisite to clear a fresh country. Such situations are not in general considered as particularly healthy. Subject to the incursions of the Indians, which may destroy some lives, or at any rate diminish the fruits of their industry."

"According to a table of Euler, calculated on a mortality of 1 in 36, if the births be to the deaths in the proportion of 3 to 1, the period of doubling will be only 12 4-5ths years. And these proportions are not only possible suppositions, but have actually occurred for short periods in more countries than one."

" Sir William Petty supposes a doubling possible in so short a time as ten years." " But to be perfectly sure we are far within the truth, we will take the lowest of these rates of increase, a rate in which all concurring testimonies agree, and which has been sufficiently ascertained to be from procreation only."

" It may safely be pronounced, therefore, that population, when unchecked, goes on doubling itself every twenty-five years, or increases in a geometrical ratio. * * * A thousand millions are just as easily doubled every twenty-five years by the power of population as a thousand." After making some inferences as to the productive powers of the earth, aided by agricultural improvements, in producing food, Mr Malthus came to the following conclusion—

" Taking the whole earth, instead of this island, emigration would of course be excluded, and supposing the present population equal to a thousand millions, the human species would increase as the numbers 1, 2, 4, 8, 16, 32, 64, 128, 256, and subsistence as 1, 2, 3, 4, 5, 6, 7, 8, 9. In two centuries the population would be to the means of subsistence as 256 to 9, in three centuries as 4096 to 13, and in two thousand years the difference would be almost incalculable."

" In this supposition no limits whatever are placed to the produce of the earth. It may increase for ever, and be greater than any assignable quantity, yet still the power of population being in every period so much superior, the increase of the human species can only be kept down to the level of the means of subsistence by the constant operation of the strong law of necessity acting as a check upon the greater power."*

Mr Malthus, after considering all the "*checks*" which exist in different countries and in different states of society, says—" All the immediate checks to population

* On Population, chap. i., vol. i., Third Edition.

which have been observed to prevail in the same and different countries seem to be resolvable into moral restraint, vice, and misery."*

These are the principles upon which Mr Malthus grounded his theory, and there cannot be the slightest doubt as to *the tendency* which exists in every flourishing population to increase beyond its *comfortable* means of subsistence; but we have yet to learn of the possibility of any population increasing in such a ratio as ultimately to produce its own sudden "*extermination*."

Wallace, in his work on the numbers of mankind, showed that the increase of the human race might proceed in a much greater ratio than that of food; but his calculations are altogether grounded on the *mere tendency* to such, and consequently cannot be applied to represent the occurrence of those ultimate consequences, as we will afterwards see, Mr Malthus dreams of—consequences which are not at all deducible from any principles of operation in the whole of Nature's laws. Indeed, such speculative conjectures are both idle and ridiculous, because the growth of mankind, so to speak, like every other natural operation, is strictly a sequence of reproduction based entirely upon a certain amount of sustenance: so, without this foundation, or means of support, such reproduction could never have a being. In plain language, population increases in proportion to the facility of acquiring food or of living; but we have no instance on record of any population permanently increasing, and continuing to exist, in a country under very limited means of subsistence: as well might we expect a continuance of an abundant crop of wheat, or of any thing else, from a soil not regularly improved by labour and compost.

The state of Ireland, regarding her starvation and increasing population, may be brought forward as an example contrary to what we have just stated *in respect to*

* On Population, vol. ii., p. 302.

*the increase of population* under limited means of living, but the very circumstance of so many of the poor Irish being obliged to seek food in other countries proves to a certain extent the truth of the position. Ireland, it may be said, for the last forty years has been the reproductive household of labourers, for a pretty large proportion of that class, both in England, Scotland, and America.

That the increase of population is *necessarily checked* by every scarcity of labour and of food, is quite evident; of this Mr Malthus himself has given us a striking example derived from the registers of Sweden. We will quote his own words:—

" The consequence of this state of things (the occasional scarcity of food) is, that the population of Sweden is in a peculiar manner affected by every variation of the seasons; and we cannot be surprised at a very curious and instructive remark of M. Wargentin, that the registers of Sweden show that births, marriages, and deaths, increase and decrease according to the state of the harvests. From the nine years of which he had given tables, he instances the following:—

| | | Marriages. | Births. | Deaths. |
|---|---|---|---|---|
| Barren Years, | 1757 | 18,799 | 81,878 | 68,054 |
| | 1758 | 19,584 | 83,299 | 74,370 |
| Abundant Years, | 1759 | 23,210 | 85,579 | 62,662 |
| | 1760 | 23,383 | 90,635 | 60,083*" |

This table shows distinctly that in the barren years the marriages and births were few and the deaths numerous, the reverse being the case in the years of plenty. But we scarcely require tables to demonstrate this; for the changes which take place, in the above respects in every community, are generally quite evident to every observing individual without any numerical demonstrations whatever.

* On Population, p. 332, vol. i., 3d Edition.

In Glasgow in 1837, the year of very dull trade, there was a considerable falling off in the amount of the marriages.

| | | |
|---|---|---|
| "The marriages in 1836 were | . . . | 2375 |
| " " 1837 | . . . . . | 2095 |
| Being a decrease of | . . . . | 280"* |

Malthus turned his attention to the Northern States of America, and, after estimating their increase of population, he says, "that the population in these states has been found to double itself for above a century and a half successively in less than twenty-five years." But we have even much more startling facts than this concerning some of the *recently* populated states of the New World. In Indiana, Michigan, &c., the population has been increasing at the rate of 200 per cent. in ten years, or a doubling of itself every five years! What an estimation would this have been in the mind of a Malthus—a "geometrical ratio" of FIVE YEARS! Such an increase is well worth Malthusian moralizings; but, alas! the wonder soon vanishes when we come to reflect calmly on its causes, both in respect to the amount of the immigration and *mature* ages as compared with the population in older states and nations of antiquity. In the older states of America the increase is not now above 8 per cent. in 10 years.

If recent reports be correct, the population of London is increasing very fast. In the time of Charles II. the whole population of the metropolis was about 400,000—it has now increased to 1,950,000; and, within the last ten years, no less than 400,000 has been added, which is, at least, a doubling of itself in 40 years. But such an increase must be chiefly attributed to the influx of strangers, and not to the inherent powers of increase in the population itself.

* See Dr Cowan's Vital Statistics of Glasgow, p. 46.

Dr Price supposed that (during the time which he wrote) London required an influx of 10,000 individuals annually to keep up her population.

Mr Malthus took too prospective a view, both regarding the causes and the consequences of increasing population. Had he only looked from side to side, and compared the increase of different states and of different nations, he would have been undeceived; and had he reflected on the page of history, he would have discovered that even nations have died almost away in the common course of natural and civil events. But Mr Malthus has taken a very different view—he seems to have conjectured that the *absence of misery and vice* in the *New World* was the chief cause of the mighty increase; and that, consequently, under such a benign state of things, population might go on increasing until the whole earth would be choke full of human beings! The following is the sublime and terrific conclusion which Mr Malthus draws from his *geometrical ratio* of increase. The first paragraph pictures the dying gasp of human nature; and, strange to say, the succeeding queries distinctly whisper that such a result is impossible! He says—"Famine seems to be the last, the most dreadful resource of nature. The power of population is so superior to the power in the earth to produce subsistence for man, that unless arrested by the preventive check, premature death must, in some shape or other, visit the human race. The vices of mankind are active and able ministers of depopulation. They are the precursors in the great army of destruction, and often finish the dreadful work themselves. But should they fail in this war of extermination, sickly seasons, epidemics, pestilence, and plague, advance in terrific array, and sweep off their thousands and ten thousands. Should success be still incomplete, gigantic, inevitable famine stalks in the rear, and at one mighty blow levels the population with the food of the world.

"Must it not then be acknowledged, by an attentive

examiner of the histories of mankind, that in every age and in every state in which man has existed or does now exist,

"The increase of population is necessarily limited by the means of subsistence:

"Population invariably increases when the means of subsistence increase, unless prevented by powerful and obvious checks:

"These checks, and the checks which keep the population down to the level of the means of subsistence, are moral restraint, vice, and misery?"*

We will briefly consider the above extraordinary conclusion, as contained in the first paragraph. Mr Malthus, in the first part of his query, acknowledges that "the increase of population *is necessarily* limited by the means of subsistence." If, then, such be really the case, how can any population increase beyond *the means* of subsistence which is absolutely necessary for its support and existence? The very idea of such an occurrence is ridiculous beyond conception, because the supposed increase, under such circumstances, *can never take place* at all. We might just as well speak of an increase of population, or of a decrease of mortality, as *possible* results of a famine on the one hand, or of a pestilence on the other. Life requires a certain quantity of sustenance for its support, however small the *minimum* quantity may be reckoned; so, when the quantity falls short of that absolutely necessary for the support of one, or of any number of human beings, the effects must be felt either individually or in the aggregate, so as to produce either distinct cases of death from total want or starvation, or the general sweeping and destructive effects of famine and disease, as has been often evinced in the almost universal destruction of some communities. But such direful consequences are now seldom experienced; for, although stagnations in trade frequently recur, the great improvements in agriculture always afford

* On Population, vol. ii., 3d edition, p. 73.

a *tolerable* amount of sustenance, so as to render the privations somewhat short of actual famine or starvation. Such being the case, the people, *of necessity*, adopt a different line of action, and moral conduct, which mitigate to a certain extent their physical sufferings. They spend the little they may earn entirely on the *necessaries* of life; they shift about to different places, and thus get employed in various ways; and very frequently they emigrate to a distant country. During such precarious times, both moral and physical restraint accompanies all their conduct —there are no superfluous eating and drinking—there are for the time fewer marriages; and, as we have seen by the Swedish Tables, there are also fewer children born. The probability is, that the number of children born is a great deal less, even among established families; consequently, the increase of population, under such circumstances, is more or less suspended, and thus *breathing time* is allowed for its resuscitation with a revival of trade, which affords the ability of procuring more abundant sustenance: thus restoring the population to its former vigorous state. Such are the means arising from necessity, by which the condition of the people, after privations, is from time to time ameliorated. Condorcet terms such changes, in the condition of society, "*a kind of oscillation between good and evil.*" He says—"In societies, arrived at this term, will not this oscillation be a constantly subsisting cause of periodical misery? Will it not mark the limit when all farther melioration will become impossible, and point out that term to the perfectability of the human race, which it may reach in the course of ages, but can never pass?"* The latter part of this paragraph is applicable to the peculiar views which Condorcet held regarding what he terms the ultimate "perfectability of the human race"—a subject we cannot enter upon. The first part refers strictly to the consequences of stagnations in trade, as causing a

* See Malthus, vol. ii., pp. 33, 34, 3d edition.

great amount of *periodical misery*. But it is quite evident that this "*oscillation*" is the grand periodical preventive check to *very* redundant population; and, consequently, is a seasonable means of relief always operating as an antidote against the causes which give rise to it: so every rapid increase of population meets with its own direct preventive checks. Although China may be almost *choke full* of human beings just now, we have no grounds in asserting that her population will *to a certainty* increase to such an extent as ultimately to produce such effects as will bring about its own sudden extermination. No; the evil will be checked long ere such could ever be felt—probably some centuries hence China may not be much more populous than she is at the present time.

Mr Malthus has not only broached his theory in a general statement of its direful consequences, but he has made a calculation of the very improbable, indeed we may say of the impossible, conceived consequences. He says—

"If we be not too well convinced of the reality of this melancholy picture (all the direful consequences of famine, even during the second 25 years of increase), let us but look for a moment into the next period of twenty-five years,* and we shall see 44 millions of human beings without the means of support; and, at the conclusion of the first century, the population would be 176 millions, leaving 121 millions unprovided for. (!!) In these ages want, indeed, would be triumphant, and rapine and murder must reign at large; and yet all this time we are supposing the produce of the earth absolutely unlimited, and the yearly increase greater than the boldest speculator can imagine."

Really such statements are flagrant in the extreme. Mr Malthus talks of the produce of the earth, compared with *the* increase of mankind, being supposed absolutely unlimited; but why does he not bring his numerous *checks*

* See Malthus, vol. ii., pp. 108, 109.

forward to bear against his all but unlimited increase of population. Although we cannot admire the spirit in which Mr Godwin has *replied* to Malthus, by way of upsetting his geometrical ratio, yet we feel convinced of the general correctness of the conclusions of the former writer, regarding the theory of the latter. Godwin says—"Myriads of centuries of still increasing population may pass away and the earth be still found sufficient for the subsistence of its inhabitants." Now, in answer to this, Malthus, with the greatest gravity says, "I am sufficiently aware that the redundant millions, which I have mentioned, could never have existed." And he continues, "It is a perfectly just observation of Mr Godwin, that "there is a principle in human society by which population is perpetually kept down to the level of the means of subsistence." But Malthus again asks, "What is this principle? Is it some obscure and occult cause? Is it some mysterious interference of Heaven, which at certain periods strikes the men with impotence, and the women with barrenness? Or is it a cause open to our researches, within our view—a cause which has constantly been observed to operate, though with varied force, in every state in which man has been placed. Is it not misery, and the fear of misery, the necessary and inevitable result of the laws of nature, which human institutions, so far from aggravating, have tended considerably to mitigate, though they can never remove?"*

In the first and principal part of the above paragraph, then, Mr Malthus admits the impossibility of population continuing to increase in his "geometrical ratio," as compared even with the greatest increase in the amount of sustenance. What more is wanted? We all see that there is the tendency; but we also see that that tendency has its limits in the numerous checks which Mr Malthus has been at so much pains in investigating in the first

* Law of Population, vol. i., p. 110, 111.

volume of his talented work. As the last part of the paragraph refers strictly to Godwin's peculiar views regarding *the government of civilized society*, it does not require to be considered in a work of this kind.

Although the theory of Mr Malthus has been very ably questioned both by Godwin and some others, none have so decidedly attacked the theoretical "geometrical ratio of increase" as Mr Sadler. He says—"Human increase, under the most favourable circumstances, *does* not proceed in a geometrical ratio, but is constantly regulated on a totally different principle."* After considering at great length all the statements of Mr Malthus, particularly regarding the population of North America, upon which he grounded his favourite theory, Mr Sadler ventures to promulgate a law of population. He says—"What I presume to call the law of population may be thus briefly enumerated. The prolificness of human beings, otherwise similarly circumstanced, varies *inversely* as their number."† This brief statement of Mr Sadler accords with the observations which we have already made regarding the effects produced upon every population by fluctuations in trade, and according to the *procurable* amount of sustenance.

The chief desire of Mr Malthus was to establish as a *theorem* that population, under favourable circumstances, increases in a geometrical ratio; and that the *checks* to such an increase are all resolvable into moral restraint, vice, and misery. Like every other theorist he has supported the abstract principle through thick and thin; but, laying this aside, he seems to have understood the principles of population as well as any of his commentators.

Notwithstanding the imaginative views of Mr Malthus regarding the *geometrical ratio of increase*, he is quite correct concerning the tendency which exists in every flourishing population to increase beyond the means of

* Law of Population, vol. i., p. 61.

† Ibid, vol. ii., p. 352.

*comfortable* subsistence. But it is most surprising that he should have laid down his broad theory upon such a quicksand foundation as he did, namely on the increase of recently populated states in America. No man could be better acquainted with the "preventive checks" to the increase of population than Mr Malthus himself, for, in the first volume of his work, he has considered them all in such a minute way, regarding every country, that it is quite astonishing he should have kept out of view their general effects in preventing such awful strides of increase as he has laid down. But the theory of Mr Malthus is very unlike his philosophy, for it seems to have been laid down merely as a paradox to excite consternation! However, the increase of population in North America cannot be taken as a criterion in estimating the real powers of procreative increase in any community—we must look to the regular population returns of some country which participates less in fluctuant population.

Sweden is a country which receives few emigrants, and sends out just as few of her own; her population can, therefore, be very little affected either by immigration or emigration. So, if we take the Swedish tables for our guide, we will come to a pretty correct conclusion as to the inherent power of increase in a population very little subjected to disturbing causes, for Sweden has been very little troubled either with war, emigration, famine or pestilence. And the Swedish tables are to be the more depended upon from their being extended through a period of fifty-four years, which is certainly sufficiently long for coming to some general conclusions on the subject. The following table of the increase of the population of Sweden is taken from Godwin's Work on Population.

TABLE

*Giving a General View of the Increase of the Population of Sweden.*

| Years. | Population. | Interval. | Increase. | Proportion. |
| --- | --- | --- | --- | --- |
| 1751 | 2,229,611 | | | |
| 1757 | 2,323,195 | 6 years | 93,534 | 1–24th |
| 1760 | 2,367,598 | 3 — | 44,403 | 1–52d |
| 1763 | 2,466,394 | 3 — | 78,796 | 1–30th |
| 1775 | 2,630,992 | 12 — | 184,598 | 1–13th |
| 1780 | 2,782,168 | 5 — | 151,176 | 1–10th |
| 1795 | 3,043,731 | 15 — | 261,563 | 1–10th |
| 1800 | 3,182,132 | 5 — | 138,401 | 1–22d |
| 1805 | 3,320,647 | 5 — | 138,515 | 1–23d |
| OR WITHOUT FINLAND. | | | | |
| | | | Diminution. | |
| 1805 | 2,424,874 | | | |
| 1810 | 2,377,851 | 5 years | | |
| 1815 | 2,465,066 | 5 — | 87,215 | 1–27th |

Total increase in fifty-four years, from 1751 to 1805, 1,091,016, or nearly one-half.

The above table shows distinctly that the population of Sweden has only increased a half during 54 years. Now, Dr Lowden estimates the increase of the population of Great Britain at 1 per cent. annually, which is just a doubling of its numbers every 100 years—very nearly the same amount of increase demonstrated by the Swedish tables; and which in all probability is pretty correct.

Mr Rickman says, " The increase of population in Great Britain has not been materially accelerated or retarded since the year 1801, having been always about one and a half per cent. per annum."* And even in Ireland, a country which we would be inclined to think would double

* Pop. Abstract, vol. i., p. 9.

its population faster than almost any other, it was found by the last census, taken in 1834 by the special commissioners, that the population had scarcely doubled itself in 43 years. Such a fact shows distinctly that, however great the tendency of any population may be to increase rapidly, there always exist preventive checks, which keep it on a level with its means of subsistence.

Now, if Great Britain and Sweden possess nearly the same power of increase in their respective populations, the question naturally suggests itself, Why does the population of Britain not increase faster than that of Sweden, when her annual mortality, as we shall see, is less? This brings us to other considerations regarding those causes which either augment or diminish a population.

We shall afterwards see that the rate of mortality varies very much in the different epochs of life—that the proportional mortality in infancy and old age is very great compared with the intervening periods. According to the Swedish tables, the annual mortality among children under 10 years of age is so high as 1 in 22—from 10 to 20 it is only 1 in 185, or nearly $8\frac{1}{2}$ times less in proportion—from 20 to 40 it is 1 in 104—from 40 to 70 it is 1 in 40—from 70 to 80 it is 1 in 9—and from 80 to 90 it is so high as 1 in 4.

The rate of mortality, then, in any state whose population is chiefly made up of individuals in mature age, must be very low compared with one which has not even a *natural* proportion of all ages. In the states of America which have been but recently populated by immigrants, the proportional numbers in *infancy* and *old age* must be small compared with those in the mature epochs of life; for few emigrants are either very young or very old, being, for the greater part, in the healthful and prolific periods of life; hence the rapid increase of the recently populated tracts in America. For the same reasons, but, of course, taken conversely, the population of old countries must be diminished, and their general mortality in-

creased. Now, as we said above, the increase of population in Britain and Sweden seems to be nearly the same; but the general mortality of Britain is rather less; so the reason why the population of Britain does not increase much faster than that of Sweden is, that her population has been greatly thinned of its mature and prolific ages by emigration and war, whilst Sweden has suffered little from such causes. The general mortality of Great Britain ought, therefore, to be less than that of Sweden; for the proportion of births to every marriage is greater in Sweden than in Britain, and the former sends fewer emigrants to other countries than the latter.

The great differences of the rate of mortality and the increase of population, in old and new states, are evidently the result both of confirmed and accidental causes, and cannot be ascribed in a general way either to the prevalence or absence of vice and misery. Malthus, ascribed the great increase of population in the northern states of America chiefly to the absence of "vicious customs and unwholesome occupations"—he made no allowance at all for the influx of settlers from other states. However it is quite evident that his "geometrical ratio of increase" cannot be applied to general speculations regarding the increase of population in the world at large. That there is an inherent power of increase in mankind, under favourable circumstances, no one will question; but we have to learn that that power will yet produce the awful Malthusian consequences! "The fundamental reply to Malthus is this, that for the last 2000 or 3000 years, the whole earth has probably been as populous as at present, and that if any ratio of increase were assumed, it would, if carried 2000 or 3000 years backward, depopulate the earth."* And Mr Sharon Turner says, "Nay, if the doubling had been once in every century only, the population of the world, even under this law of duplication

* Million of Facts.

every 100 years, would, at the accession of George III., or in 1780, have exceeded 54,945,138,660,498,432 persons; for this number would have evolved, at this protracted ratio, by the year 1752; and yet all the inhabitants at that time on the globe were not the fifty-millionth part of this amount, even if we suppose that there were then one thousand millions living on the earth." (Dr Casper reckons the population of the earth at only 960 millions even at the present time.) Mr Turner continues, "These calculations prove, that the doubling of mankind, by any fixed law or ratio whatever, is no part of the plan or operation of our creation, but that the human population is guided and governed by the Divine will, with specific laws adapted to His purposes, and that it is always in every age and nation acted upon and subjected to such laws as are most suited to it, and as tend to produce, alter, or continue its existing state, and that it never will be suffered to be any where what it ought not to be."*

Indeed, the calculations and fears of Mr Malthus and his followers *regarding over population* are mere chimeras of imagination, founded on premises which have no general existence, and which are quite inapplicable to any theory regarding the population of a civilized world. A state composed at first chiefly of young marriageable persons, and where there is a constant influx of young emigrants, as was in the northern states of America, may increase for a time at the rate pointed out by Mr Malthus, but its continuance in a "geometrical ratio" of 25 years is not possible; for, as the state becomes older, its powers of increase will both naturally and necessarily diminish, because the proportional numbers of births and emigrants into it will become less and less—corresponding in the one case to the fixed laws regarding the number of children which each marriage on an average produces, and, in the other, to the essential diminution in the number of emi-

* Turner's Sacred History, vol. iii., p. 99.

grants, which must take place in effect of a gradually increasing population.

It is obvious, then, that the increase of numbers in every state, or country, depends at first on its exigences for human labour; but as its wants, in this respect, become filled up, so will its laboured products find only a limited outlet in the transfer of other nations, and the number of emigrants will accordingly diminish. Every state, therefore, comes to be regulated by the general laws, as well natural as civil—so small is the power of human beings in altering those limits to population which are the necessary consequence of animal consumpt. But however much a population may increase under limited means of subsistence, it is quite obvious that that increase must find its limits long ere the majority of its people come to any thing like actual starvation; for no one will deny that the animal body does require, under all circumstances, *a certain amount of nourishment* for the preservation even of health, and likewise to enable it to perform those duties necessarily required for its own maintenance, however mean that may be. For example, although the state of Ireland should continue to be the same for centuries to come, and although her labouring people should also remain in the same commiserable state of politic approbation, it is utterly impossible that her mendicant, yea even her labouring classes, could exist in a state *many* degrees nearer to actual starvation than they are at present. In the course of time, owing to a too rapid increase of any particular population in proportion to what may be deemed the expedient, or perhaps the apparently requisite, improvement of the country either regarding the manufacturing or agricultural resources, there may be, for some years afterwards, a continuous depression of the condition of the working classes; but after a period, more or less limited, they will be reduced to that state, we may say, of permanent poverty in which at least a portion of the successive generations must always remain.

If the tenor of the foregoing observations in this chapter

be correct, it is obvious that the increase of population is merely a necessary consequence upon increase of labour and sustenance, and that the mean duration of life and the general mortality are just in accordance with the healthful state or not of the country; but, of course, very much influenced by the general habits and customs of the people, and also by the fluctuant state of population. So we have no reason to fear, with Montesquieu, that the earth may yet become barren of human beings, otherwise than by those causes which might render it unfit for human support; and which would be quite a just and natural dissolution of the existence of man—an event not less wonderful, yet not more explicable, than his creation. And, again, since the present population of the earth is a mere handful, compared with the extent of its surface, the speculations of Malthus and his followers are quite useless. The population of the world was computed at 700 millions—the surface of the earth at 50,000 millions of acres, 40,000 millions of which are capable of being cultivated. Now, according to the calculations of Lauderdale, England itself could support 180 millions of people on *vegetable* diet, or nearly a fifth part of the present population of the earth! But we do not require to have recourse to any visionary schemes in explaining away those fallacies which have been raised from time to time regarding the dangers of over population; for, as we hinted before, man grows or springs into being just according to the demand and necessity for his labour, and, consequently, according to the means of sustenance: as these decline so does his reproduction—the one follows the other as an unavoidable consequence of the reciprocal effects from changes in each. An increase of manufacture, or labour of any kind, invariably creates an increase of population, and *vice versa.*

*On Marriage in Relation to Population and Mortality.*—We have already stated that, in every population which is rapidly increasing by an excess of births, the mean duration of life will be shortened in a corresponding ratio, because of the numerous births, and the consequent

preponderating mortality in early life. Numerous births, then, augment the *general rate of mortality*, and thus mark a shorter period *of the mean duration of life*, even in an increasing population. But, according to Mr Milne, the rate at which the population of England and Wales is increasing at the present time diminishes the *proportional mortality* at least 5 per cent. The statements which we have given regarding the increase of population in France and England, as compared with their proportional numbers of births and deaths respectively, show that both the proportional mortality and the mean duration of life in each country bear a corresponding ratio to the amount of the births; but although the mean duration of life is shorter, and the general rate of mortality greater in France than in England, still the former country has an increasing population, and its proportional mortality kept down in a ratio corresponding (as in England) to the amount of its increase. We will now compare some other countries with France and England, in respect to their number of births, marriages, and deaths, as affecting their general rate of mortality and mean duration of life.

TABLE

*Of the proportion of Marriages, Births, and Deaths in different Countries, in proportion to the Population :—*

| Places. | Marriage annually to Population. | Number of births to each Marriage. | Annual Mortality. |
|---|---|---|---|
| In England and Wales, | 1 to every 134 | 3.8 | 1 in 45 |
| France, . . . | 1 to every 127 | 3.8 | 1 in 39 |
| Sweden, . . | 1 to every 112 | 4.125 | 1 in 40 |
| Norway, . . | 1 to every 130 | | 1 in 45 |
| Pays de Vaud, . | 1 to every 140 | | 1 in 49 |
| Russia, . . . | 1 to every 126 | 5 | 1 in 41 |
| Savoy, . . . | 1 to every 126 | | |
| Denmark, . . | 1 to every 126 | 4.89 | 1 in 42 |
| Netherlands, . | 1 to every 126 | 4.5 | 1 in 40 |
| North America, . | ... | 4.5 | 1 in 40 |
| Quebec, . . | ... | 5.5 | |
| Canada, . . | ... | 5 | |

The above table gives an average of fully 4 1-10th births to every marriage, which is supposed to be about the general average throughout civilized nations. But from the table it does not appear that the general rate of mortality and the proportion of marriages to the population bear a corresponding ratio in respect to the fact that numerous marriages and births always augment the number of deaths. For example, the general mortality of Sweden is lower than that of France, although Sweden has a much greater proportion both of marriages to the population and of births to the marriages: such is the case also in Russia, Denmark, and the Netherlands. According to the relative proportions given of the marriages to the populations of France and England, the mortality of the former, *ceteris paribus*, would only be about one in 42, instead of one in 39, if the number of marriages were exactly the same as that of the latter. But as there exists such an apparent difference in the rate of mortality of the two countries, France requires a greater number of marriages and births to keep up her increasing population; so, from her excess of births and the consequent increase of mortality, arising from the numerous deaths in early life, not to speak of any other unhealthful influences at all, her mean duration of life must be much less than that of England. But perhaps too much importance should not be attached to this particular influence as affecting either the expectation of life, or the general mortality in any country, for we have seen by the table that Sweden, Russia, Denmark, and the Netherlands, have all a higher proportion of marriages than that of France, and that notwithstanding their general rate of mortality is somewhat less.

Say has remarked, *if men live long, a less number is born*, and Malthus says—"Marriages, births, and deaths diminish generally in proportion to the increasing healthiness of a country." Sadler says—"The prolificness is greater where the mortality is greater, smaller where the mortality is less."

According to Mr. Woronzow Gregg, the fewer marriages in proportion to a population, there are the more children born to each marriage. "In Limbourg, where there is one marriage every year for 90 of the population, the average number of children to a marriage is 3. In East Flanders, where there is one for 165 of the population, the number of children to each marriage is between five and six. In those parts of France where the proportion of annual marriages is as one to every 112, the children are $2\frac{1}{2}$; in those where it is as one to 160, the children are $4\frac{1}{2}$. Similar results have been obtained in England. There can be no other reason for this law than that, where marriages are few in proportion, there must be a superior prudence, ensuring better provision for the consequences of marriage."*

Both very early and late marriages produce a weakly offspring, and, consequently, tend to augment the general mortality, but much depends upon the circumstances of the parents. We see daily the painful consequences of too early marriages—great numbers brought into the world merely to the dawn of existence. Besides being feeble in body, and, consequently, more liable to disease, the progeny of very young parents, from amongst the labouring, and a very great proportion of the working classes, is generally subjected to all the ills which arise from limited means of subsistence, from insufficient clothing—in short, from the want of all those comforts which are absolutely necessary for the growth and health of infancy in civilized society. Indeed, early marriages, coupled with limited means of sustenance, are the greatest obstacles to general improvement which a country has to contend against; because they entail an almost overwhelming amount of disease and universal misery amongst the class which they mostly affect, namely, the working people. But if the conduct of the people, as to their

* Figures of Arithmetic *versus* Figures of Speech, Chambers' Journal, May 4, 1839.

means of living, education, and morality, were such as to qualify them for the proper performance of the duties of life, then the evil consequences might to a great extent be averted; but in Scotland and Ireland, in particular, poverty, or, in other words, the absolute want of the means of bringing up a family, does not act as the slightest check, upon a very great proportion of the labouring and working classes, in deterring them from early marriages. Indeed, in Ireland and in the rural districts of Scotland, the very reverse is the case—the real necessitous in both seem to adopt marriage as a *panacea* for all their sufferings—they are not in the slightest influenced by any moral restraint whatever. In Great Britain the average time of marrying is 24. In France it is later, being about 26—the females being generally about the age of 24, and the males about 29. In Holland and Belgium the greater number of men marry from 28 to 30 years of age. Regarding the general time of marrying, then, there seems to be a considerable difference in different countries. In France and Britain the difference may not be thought very great, being only 2 years. It is somewhat singular that in both countries the average number of births to each marriage is the same, which shows that France does not suffer in the least in her population from her late marriages, and the probability is that *early* life, *ceteris paribus*, is fully more precarious in Britain than in France. However, be that as it may, the French people are certainly all the difference more comfortable and more improvable for their later periods of marrying; for embarrassment, of whatever kind, always prevents individual improvement, and too early marriages are almost universally attended with insurmountable family difficulties. So, if we can venture to draw any inference from comparing France and Britain in these respects, we may safely state that marriages in the *more* mature periods of life do not lessen the proportional amount of births, and, consequently, do not increase the

proportional mortality even in this respect. Common observation and experience teach us, that in the most of large families amongst people in straitened circumstances, and who have married early, the mortality is usually very great, and particularly in large towns. It is no uncommon thing in such cases to see the greater part of a large family cut off during infancy or childhood; and even if they should not be cut off in their early years they very frequently are in bad health, and thus constitute a great burden upon society at large. But if the offspring of the *more* mature marriages be generally more robust and better brought up, it follows that early marriages, *ceteris paribus*, must increase the general mortality, and thus entail a great amount of misery and disease upon the population, not to speak of the overwhelming amount of unproductive and burdensome individuals which such a practice creates. The reader who wishes to be more conversant with the evils resulting from too early and improper marriages, will derive much valuable information from reading Dr Alison's excellent work "On the Management of the Poor of Scotland."

Although the progeny of late marriages is generally weaker than that arising from those in the prime of life, still the evil is in a great measure rectified by the greater attention and comforts which infants experience from parents who have provided for, and consequently who are able to administer to, all their wants. Such being the case, the children of parents advanced in years are well cared for, and perhaps enjoy, *ceteris paribus*, better general health, and consequently a higher expectation of life in the years of infancy and childhood, than even those of younger parents, who, although more robust in body and constitution, are more exposed to the many causes of disease as affecting large families. In speaking of late marriages, we may mention here a circumstance or fact, which has not, perhaps, been generally thought of, and which may in future times have some effect in preventing

marriages betwixt parties of very unequal ages. It is said that young individuals suffer in their health from sleeping with the aged—that the former give out a certain amount of their vital principle or warmth to the latter, and thus become sooner deteriorated in their vital endowments. Of this David seems to have been well aware when he obtained his young wife; but it does not appear that the fair portion of the human creation has been hitherto aware of the opposite effects produced upon themselves. Will the time ever arrive when the worn out old bachelors will go about in absolute despair of being able to procure a youthful partner, to cheer their wintry minds and to resuscitate the fading embers of their corporeal vitality?!! That old people do abstract the vital principle from the young, there has been positive proof. Children who have slept constantly with their grand parents, it has been observed, become shrivelled and old-fashioned like; and there is a case recorded, but the writer forgets where, of a young girl who became very bad in health and old looking, which she herself ascribed to sleeping constantly with an aged parent.

*Lactation in Relation to Population and Mortality.*—Children suckled by strange nurses, or those much fed upon spoon-meat, are generally not healthy, and, consequently, a great proportion of them die early. This we have already illustrated in speaking of the mortality of foundling hospitals. But Dr Louden, in his ingenious work on "The Equilibrium of Population and Sustenance," has pointed out in a very satisfactory manner the influence which the term of suckling has in increasing or diminishing the numbers of mankind. He says that the period of lactation or suckling must have a decided influence over the increase of population in different countries. It is well known that during suckling mothers are not apt to become *enciente*. So in any country where it is the custom to prolong lactation beyond the natural period, there

will be a great defalcation in the increase of the population. He states that in China the population is excessive, although *infanticide* is in a manner uncondemned; but there a child is weaned very early, "as soon as it can put its hand to its mouth." He attributes the decrease of the numbers of the North American Indians, the Charibean races, and the West India negroes, to prolonged lactation. These tribes suckle their children till they are able to run about—they are often not weaned at 2 or 3 years of age.

Now, Dr Louden has calculated that the population of the British Isles increases about ten per cent. every ten years; and from his calculations regarding the effect which prolonged lactation would have in diminishing the number of births, he has come to the conclusion that if suckling were continued one-third longer in this country, namely, to about 14 months, it would put an entire stop to the increase of population.

Dr Louden has the entire merit, we believe, of bringing these curious and important considerations before the public.

If lactation were prolonged in this country, then, to 14 months, instead of 10 or 11, according to Dr Louden, our population would be at a stand; and, according to Mr Milne's calculations, our general mortality would consequently be increased 5 per cent: in short, like the Charibean Indians, we would soon be in a backgoing state. But in any flourishing country such as Britain, the loss would be made up by a greater number of marriages. So true it is that every increase of labour or manufacture creates for itself a new, and an abundant, population.

*Medicine in Relation to Population and Mortality.*—The great decrease in modern times of the general mortality of the human race, may be partly attributed to improvements in the practice of medicine. Although we have not the means of estimating the advantages which judicious medical treatment possesses over empiricism, or

over no treatment whatever, we can easily conceive what would generally be the result in the most of acute diseases if no medical treatment were adopted.

From what has been said on acute diseases in Chapter II., the reader will have little hesitation in considering the most of them at least not free of danger, for assuredly every acute inflammation of any of the vital organs is essentially a dangerous disease. Even fever, which of all diseases it is allowed possesses the greatest share of the *vis medicatrix naturæ*, or healing power of nature, is very apt, as we have shewn, to end fatally from the supervention of local inflammatory affections.

But every impartial observer must admit that medical treatment generally relieves the patient less or more; now, no hurtful agent, in whatever way applied, ever gives permanent or even *satisfactory* relief to human suffering: it may, therefore, be laid down as an axiom, that whatever gives *satisfactory* relief does good. The unprofessional reader will not be prepared to admit all that might be advanced in favour of the beneficial effects of the practice of medicine; but the very circumstance of medical treatment being all but universally sanctioned, and depended upon, is of itself very strong proof of its sterling importance.

If there existed, or had existed, any class of civilized individuals who considered the regular practice of medicine entirely fallacious, and had acted accordingly, correct inferences might have been drawn from comparative results as to the medical and non-medical system.

In order to illustrate the beneficial effects of the practice of medicine we will quote again from Dr Hawkins. He says, "Medical statistics afford the most convincing proofs of the efficacy of medicine—it is one of the easiest arguments which can be employed to refute the vulgar notion that nature is alone sufficient for the cure of disease, and that art as frequently impedes as it accelerates her course. The powers of self-restoration are in no

diseases more conspicuous than in fever. But if we form a statistical comparison of fever treated by art, with the results of fever consigned to the care of nature, we shall derive an indisputable conclusion in favour of our profession.* Hippocrates has left a frank and explicit statement of the history and fate of forty-two cases of acute disease, in which it does not seem that any therapeutical plan was adopted, if we except glysters and suppositories in a few, and blood-letting in one. Among these were thirty-seven cases of continued fever, without local affection. Of the thirty-seven twenty-one died—above half of the whole. But if we examine the returns of the Fever Hospital of London, we find (in 1825) that the total mortality was less than one in seven, and half of these deaths occurred within seventy-two hours of the admission of the patient—a circumstance which indicates that several entered at a period of the disease when the hope of recovery was extinct. In the Dublin Fever Hospital we find a still lower mortality: the average from 1804 to 1812 was one in twelve: and in the clinical wards at Edinburgh, in 1818, the mortality of fever was also one in twelve. Of five cases of local inflammations which Hippocrates records, four were fatal; of all his forty-two patients, in short, twenty-five were lost: a termination which throws no shade over his skill, but only brings to light his love of truth. The mortality belonged to the age and not to the physician, and we may reasonably infer, that under other practitioners of his time and country, it was even more severe. It is curious to observe, that of the five cases of local inflammation, the only one which survived was the solitary instance in which the bleeding was employed—a pleurisy. We perceive that one out of two acute cases may recover by the almost unassisted efforts of nature, but that under the medical protection of our own age and country, six out of seven, or even eleven

* Blane, Select Dissertations.

out of twelve, are likely to survive, according to the period of the disease at which they are placed under treatment."

From the above statement it appears that the *regular* medical treatment of the present day does at least double the chance of *perfect* recovery from the most of diseases; not to speak of the bad effects which would otherwise remain in cases which might not end fatally. Taking even this very limited view of the subject, and considering the universal prevalence of disease, it cannot be gainsayed that regular medical treatment has a decided influence in increasing the mean duration of life, and, consequently, in doing away with the necessity, to a certain extent, of numerous births and deaths.

# CHAPTER IX.

On the Influence of Climate on the Duration of Life—On Climatorial Organization—On Climatorial Diseases, as affecting the different Races of Mankind—On the Mortality of different Countries, Cities, and Places; and on the Mortality of the whole World.

*On the Influence of Climate on the Duration of Life.*—A temperate and moderately dry climate, it is generally allowed, is most favourable to the duration of life; but we have instances of great longevity in climates the most opposite of each other. However, particular cases of long life cannot be considered as positive proofs of a country's salubrity, for such cases can generally be accounted for by reference to the habits of the individuals. Some writers, particularly Dr Casper, are of opinion that the duration of life is very little affected either by climate or soil; whilst others entertain a contrary opinion altogether. M. de Jonnes is of opinion that a sharp cold climate, particularly on the sea-coast, is favourable to health and longevity. Perhaps the life of man is more influenced by the nature of the soil, and his habits of living, than by the temperature of the climate; for we find that some countries, quite the opposite of each other, both in point of heat and moisture, yield almost the same measure of human life. But such is not the case even in different places of the same country; for every locality possesses peculiarities, both regarding climate, soil, and human pursuits, which so affect the vital endowments of man as to render him either a full measure of the bowl of life, or which, perhaps, curtail the allowance to a third less than what might be considered the natural term of existence.

It is said that "The mortality among the Icelanders has been estimated at one in every thirty-three of the inhabit-

ants—a proportion which is somewhat less than some districts of France and Spain, such as in the departments of Vaucluse and the Eastern Pyrenees, and very considerably less than among the Russian-Greek population. It exceeds only by one or two per cent. the average mortality in the Prussian dominions, which would seem to be actually greater than among the slave population of Havannah. But then the average duration of life in England, France, and Belgium is considerably higher than in Iceland—by at least ten years in the first, and seven years in the latter two countries.

" Again, to show how little the mere influence of a cold climate, apart from other circumstances, can be deemed favourable to the prolongation of life, we may state, that whereas there is a mortality of one in every 25.8 of the Russian-Greek population, and the average duration of life does not exceed 21 or 22 years, the mortality of some districts in Switzerland, where the climate is quite as severe as in Russia, does not exceed one in every 49 of the inhabitants, and the average duration of life is nearly as high as 49 years—a ratio which exceeds the former by at least a double.

" Then let us take an instance of two climates strikingly opposed to each other—viz. humid and marshy Holland on the one hand, and sandy Brandenburgh on the other; and yet, if we examine the bills of mortality in these two countries, we shall find that they exhibit a very marked approximation, the one to the other, as appears in the following table, published in the inaugural dissertation by Casper and Hirkott.

" The average duration of life is—

| At the age of | In Holland. | In Brandenburgh. |
|---|---|---|
| 0 years | 34.5 years | 30 years |
| 5 ,, | 44.4 ,, | 44.3 ,, |
| 10 ,, | 42.6 ,, | 42.8 ,, |
| 20 ,, | 36.2 ,, | 35.6 ,, |
| 50 ,, | 19.4 ,, | 17.7 ,, |
| 70 ,, | 9.1 ,, | 8.1 ,, |

" From these and similar data we may reasonably conclude, that temperate climates are most favourable to the duration of life, but that those the rigour of which is excessive may be to a certain extent overcome by human intelligence."*

In some countries, people come much sooner to maturity than in others, and they also die sooner ; but notwithstanding this, their mean term of mature life may not be much less than that of those who are later of arriving at maturity, and who, consequently, enjoy a longer period of existence. From this fact it appears, that the human frame, constituted as it is at present, is capable of continuing in mature action only for a certain number of years—the length of time being regulated by the general effect produced upon different individuals by the operations of all those influences which affect man as a moral and civilized being.

It would be quite contrary to rationality to suppose that the mean duration of life could be any thing like equal in all countries, when we take into consideration how much almost every country differs from another regarding all those influences, every one of which affects the human constitution in a way peculiar to itself. With every variety of climate there is a corresponding adaptation of soil and vegetation, which leads also to corresponding varieties and changes in the organization both of man and animals ; so, according to those adaptations respectively, there are many relative effects produced ; and the system of man is thus modified or changed by those very principles which, under a befitting harmony of action, are the essential support and stimuli of life. In some countries periodical epidemics sweep off immense numbers of the population ; in others there is an almost uninterrupted course of *endemical* disease throughout whole seasons, thus laying thousands of individuals, of all ages, premature victims to disease and death. In other

* Medico-Chir. Review, April 1840 ; Bulletin Med. Belge.

countries, again, there is a regular succession, or rather continuance of different diseases, which are constantly filling up the bills of mortality: and, if we add to these the various tendencies to particular diseases which exist now in the different human races, we are led irresistibly to conclude that the rate of mortality in every country must vary just according to the influence of all those causes which prey upon the human frame. Hereditary defects, intemperance, vice of every description, habits of living, pursuits, and mental disquietude, are all potent influences over the life of man; and as we have seen, according as his constitution, his temperament, and the adaptation of his body harmonizes with his situation in life, so is his general health, good or bad, and his life accordingly prolonged.

It has been often said that man is adapted for living everywhere—under the burning suns of the torrid zone, and under the greatest cold of the arctic winter. True, he can live anywhere for a time; but can he live to the full capacity of his natural endowments? A very different tale is told in the appearances of those who have been long away from their *native* land. Every change, in way of living, in climate, and in social intercourse, has told so effectually on the constitution, both of their mind and body, that they are no longer the possessors of their primitive habitudes. The climate has changed the external appearance, and it has also modified the natural dispositions of the internal vital organs; and the different social habits have called into being new propensities, and new liabilities to disease. In short, the system has become altogether changed—a new relationship of actions has been lighted up, and these new actions have brought on diseases to which the system was not *naturally* predisposed.

*On Climatorial Organization.*—The organization and constitution of the aborigines of the different countries are essentially adapted to the particular influences of their respective climates. This adaptation of body fits one for

living in his native country; but, strictly speaking, it fits him for no one else, unless at the expense of his health, and the shortening of his life.

The physical causes which influence the health of man may be in a general way referred to climate, as existing in the TEMPERATE, the FRIGID, and the TORRID ZONES. Such a division is perhaps too general, but we will have occasion to be a little more particular as we proceed.

As these ZONES differ very much, both in their mean and extreme degrees of temperature, so must the different races of mankind, by which they are inhabited, differ also both in their bodily frame and constitution; for every climate either possesses, or has modified, an organization of mankind peculiar to itself. Although there are many peculiarities to be observed in the different races, both in respect to the formative and nutritious functions, it will not be necessary to enter into a minute detail of all the differences which exist, so we will only consider those which have a direct causation in the production of climatorial disease.

To take a comprehensive view of mankind, we will divide them into three great classes, corresponding to the three great divisions of the world. These are the *white*, the *black*, and the *copper* coloured races. The *whites* are situated chiefly toward the polar regions; the *blacks* within the torrid zone; and the *copper* coloured races, or those of a middle complexion, between the two, or chiefly in those countries bordering on the latter. There are some exceptions to this general rule, but they are easily explained from known circumstances, for it has always been observed that the difference of countries, in respect to soil, elevation, rivers, and mountains, alters greatly the appearance of the inhabitants. Indeed, the conformation of the human body is often modified very much from the influence of local causes alone. In all countries where the natives are of a dark colour, the races living in mountainous districts, and on elevated tracts of

land, are uniformly of lighter complexion, and otherwise different from those living in the low plains and on the sea coast—a circumstance which shows the powerful influence of locality, even under the same latitude, in changing, at least, the appearance of man.

Although we have assigned, for the sake of simplicity, each of the three great divisions of mankind to their respective zones as their natural climate, we do not presume that such an arrangement can be strictly followed in investigating the *physical causes* of premature death in all the different races. But, as this division embraces the most important physical variations in the human race, we have adopted it in order to present a prominent outline of some of the diseases generally incidental to each of the three great divisions.

We have said before that the development and particular organization of man differs in every country according to the effects produced, and the demands made upon particular parts of the system, by the influence of climate and locality. The burning heat of the torrid zone tells most effectually on the organization of the skin, or, in other words, on the external functions of the body. The dark skin of the negro has a more complicated function to perform than the fair skin of the European. The skin in the dark races exhales much more perspiration and *carbonic acid* from the system, hence it is a much more active depuratory organ in the blacks than it is in the whites. The dark skin likewise secretes an unctuous matter, which protects the body from the burning influence of the sun's rays. It also radiates the internal heat much quicker. So, in the black or dark races, the skin is a more active functional organ; and, consequently, differs essentially from that of the whites. But, whilst the skin of the negro performs a more elaborate function, there are other parts of his system which are less extensive, and consequently less active in their vital operations. The whole body of the black is much more slender than the white—the limbs are generally

small and not prominently developed; the chest is flat, and the respiratory organs only proportionate in volume; the abdominal viscera are also not so full in their respective capacities, the liver, in particular, being much smaller. The head differs also in many respects, being smaller, different in shape, and containing much less brain. The skull is much thicker, and so are the membranes which cover the brain, which provision gives a greater protection against the burning heat of a vertical sun.

The European, on the other hand, has a clean white skin, which perspires copiously under heat or violent exercise, but there is little structural provision for any other function, the depuration of the system being chiefly effected by other means, for which purpose we have a much fuller development of all the internal organs which operate to that effect.

The Esquimaux, or those races near the pole, are also different in their organization. The severe climate, and the absence of solar light for two-thirds of the year, tells considerably on all their vital manifestations. They are in general completely stunted in growth, and all the outlines of their body and features betoken the effects of a rigorous climate. The races which inhabit the polar regions present rather an ungainly appearance—their skin approaches to a dirty white or grey, and seems altogether more like a covering than a functional part of the system. The features are flat, broad, and void of intelligent animation; the eyes are far apart; the forehead flat; in short, the whole figure presents an appearance strictly indicative of stinted growth. In many parts of the Russian territories the condition of the inhabitants is very little superior to that of brutes. The miserable state of the Siberian *boors* is said to be almost beyond description; but the fault is in a great measure owing to their own natural indolence. They are both mentally and corporeally inactive in the extreme; for nevertheless of the exertions which have been made by the government for their improvement,

they still remain in such apathy that much improvement of them seems almost impossible. Indeed, the whole of these races of very northern climates seem to be possessed of such stinted phlegmatic constitutions, that it is almost impossible to raise them a step higher in civilization. Such is the effect of a rigorous climate on the human constitution. It may be thought very remarkable that the condition of the Siberians should be so wretched, considering the general productive nature of the soil; but the great obstacle to their improvement is the imperfect organization or development of their nervous and mental faculties, and such is the case with all the inhabitants of the polar regions.

*On Climatorial Diseases as affecting the Different Races of Mankind.*—Climatorial diseases are those affections to which the aborigines or the acclimated in a country are almost peculiarly subject. For example, all the dark races, and particularly the negroes, are very obnoxious to diseases of the skin, and especially to that class which is characterised by a fulness of *vascular action;* such as the *jaws*, *itch*, *elephantiasis*, *lepra*, *small-pox*, and many other such diseases. From the great sympathy which exists betwixt the skin and the internal organs in the dark races, sudden impressions made upon it from cold and moisture are very apt to end in most dangerous maladies, such as dysenteric fever, and violent diarrhœa. Although diseases of the skin and bowels are the most common complaints amongst the dark races, according to Mr Tulloch the mortality from fever is now very great amongst the negroes in the West Indies; he says, "of all the diseases which tend to the rapid diminution of this ill-fated race those of the lungs are by far the most frequent and fatal." *

The whites, in intertropical countries, are generally affected very differently from the blacks. Skin diseases as

* See British Annals of Medicine, No. XIII. and XV.

affecting the former may be more or less modified by the particular influence of the climate or locality; but they never take on the specific action of those as affecting the dark skin of the negro or creole: and, when a negro or creole takes the fever of the country, it assumes either the remittent, intermittent, or continued type; but with the European it is very different—a marked determination generally takes place to the liver and contiguous viscera, hence the frequency and fatality of liver complaints, accompanied with yellow fever, amongst the whites in hot climates.

Dr Pinckard says, "Next to fever, ulcers have been the severest scourge of the troops, and in both of these maladies we have witnessed multitudes of instances in sad proof of *the fatal influence of climate* upon our patients: while an European has been cut off in a few hours by that ardent and merciless destroyer, the yellow fever, a colonist has experienced a slight attack of the bilious remittent, and a negro had to support the simple paroxysm of an ague; or while an English soldier has lingered and died from only a slight scratch or excoriation, the African and the creole have rapidly recovered from the widest and most perilous ulcers." * Such are the effects of a hot, moist, and insalubrious climate upon those who have not been acclimated *or born* to its influences.

Now, the salubrity of a country depends upon the influences of a great many physical causes. Its distance from the equator—its soil and vegetable productions—its elevation above the level of the sea—its prevailing winds and currents of air—its proximity to, and the extent to which it is surrounded by, the ocean—its rivers, lakes, and mountains, and the humidity of its atmosphere, must all be taken into account as to its general salubrity. But there are also many individual circumstances which have a most powerful and direct influence over health in certain locali-

* Notes on the West Indies, 1806.

ties. There are, the cultivation of the soil—the elevation above the surrounding country—the proximate hills and valleys—the rapidity of the streams—and, above all, neighbouring stagnant marshes, all of which exert a mighty influence over the salubrity of any tract or district of land.

It is generally thought that individuals labouring under pulmonary consumption are relieved by removal to a warm climate. That such is frequently the case we have every reason to believe, for, by such a change, the skin and all the biliary organs are called into more active operation, whilst the respiratory organs are in an equal ratio relieved. But it is a very singular fact that consumption of the lungs is more than doubly fatal amongst our troops serving in the West Indies than amongst those at home; and daily observation convinces us that a very great proportion of those who go to warm climates become affected with this fatal disease.

Whilst the diseases of intertropical countries are characterised chiefly by diminished nervous power, those of temperate climates generally give rise to increased or inflammatory action throughout the whole system. In the northerly climates, and particularly in Europe, the diseases are generally of the inflammatory type, indicative of the prevailing temperament of the people. Although fever in large towns, and in the neighbourhood of stagnant marshes, often assumes a low or typhoid type, the general run of diseases are of a phlogistic or inflammatory nature. Inflammations of the chest, bowels, and brain, occur very frequently as primary diseases, and even in the course of typhus fever there is nothing more common than active inflammation supervening in one or more of these important parts, and not seldom with all the force of a primary affection. In this country, fever in general is of an inflammatory nature. The typhoid, the catarrhal, the intermittent, the remittent, the rheumatic, and the bilious fevers, are very often accompanied with internal inflamma-

tion; and all the eruptive fevers are characterised by a fullness of vascular action.

As it is with the European in hot countries, so it is with the dark races in our country, for disease attacks and affects them in a very different manner from what it does in their own climate. When a native of a warm country has migrated to a colder one, the relative workings of his system become completely changed—the skin ceases to discharge its wonted quantity of excretory matter from the system, in consequence of which the internal organs have a greater demand made upon them—the liver, lungs, bowels, and kidneys, all participating in the increased action required for freeing the system of its superfluous matter. So the negro, when attacked with fever or any other severe complaint out of his native climate, is very apt to be cut off from internal inflammation. Indeed, the blacks and even men of colour seldom stand the diseases of this country—their vital organism not being adapted for throwing off the complaint, all the vital powers very rapidly give way.

The Esquimaux, and the different races inhabiting the polar regions, although possessing a low degree of nervous and vascular energy, are, nevertheless, rather subject to inflammatory complaints, which may be easily accounted for from their manner of living. They eat great quantities of strong animal food, which invigorates their system, and thus enables them to withstand the severity of the climate. Being thus rather of a full habit of body, and much exposed to severe cold, they are very subject to cachectic diseases, originating in asthenic inflammations. Low fevers, complicated with internal inflammations and profuse bleedings, are very fatal to the inhabitants of the polar regions. In some of the low tracts of Siberia, the inhabitants very frequently suffer from wasting diseases termed *epizooties*, which, it is thought, are generated by the marshes. All the diseases in these northern climates partake, more or less in their course, of a low typhoid

type, which frequently ends in morbid hæmorrhages from the breaking up of the soft solids of the body.

Every country, therefore, has its own peculiar diseases, affecting the natives in a manner natural and peculiar to their organization; but again affecting in a very different way those whose constitutions are not modified to the nature of the climate. So migration, from one country to another, invariably alters the system, according to the nature of the prevailing influences. A native of Africa, if removed suddenly to some northern part of Europe, would no more thrive and be healthy than a hot-house plant would under the severity of a frost biting wind. Such is the influence of climate upon all animated beings—their mutual associations are all peculiar in these respects.

The European, in migrating to a hot country, has the action of his skin and liver increased, whilst that of the lungs and kidneys is diminished; the mass of the blood is thus not properly purified by the lungs; the liver becomes unduly excited, and consequently has all its functions much increased from being called upon to free the system of those impurities which were wont to be carried off chiefly by the lungs and kidneys. The migration from a hot to a cold, or temperate, climate, is equally dangerous; but particularly so to the dark races. In a cold country the skin of the negro, or of the Mongol, is no longer excited by heat, and it thus becomes almost inert as to the functions it was destined to perform; the lungs, bowels, and kidneys, therefore, take on an increased action, which, together with the depressing influence of the cold upon a system altogether adapted to a warm climate, gives rise to many serious diseases of these organs—such as bronchial consumption—protracted bowel complaints—tubercular affections of the lungs and liver—and other diseases ending in a cachectic state of the system. Such are the diseases to which the blacks or natives of hot climates are subject when removed to northern latitudes. Seldom

does a native African live above two or three years in Europe, if he has been brought direct from the scorching suns of his native climate; but, if he has been for some time in the West Indies, or any other country possessing a medium degree of temperature, he may live in southern Europe to a pretty advanced age—even to the full expectancy of life.

Migration from one climate to another, therefore, shortens life; but its influence in this respect will depend very much on the original stamina of the individual, on the general salubrity of the place, and on individual habits of living. We see some instances of individuals returning from the West Indies apparently as well in health as when they set out, but the great majority return very unhealthy. They come home mere wrecks on the rugged shore of existence, and, if overtaken by any serious disease, their altered constitutions but very feebly resist its shock.

Such are a few hints regarding the prevailing diseases amongst the different races of mankind. We will now consider the general mortality of different countries and places; and, in the course of doing so, we will take the opportunity of pointing out some peculiarities which distinguish the different national characters, and likewise how these peculiarities coincide both with climate and locality, and also with the diseases to which the latter give rise.

*On the Mortality of Different Countries.*—Europe, including the British Isles, being situated chiefly in the temperate zone, being washed on three of its sides by the ocean, and being the best cultivated and most civilized quarter of the globe, possesses all the advantages, both in a physical and civil point of view, calculated to promote long life and health. And the inhabitants of Europe, generally speaking, are of a constitution which enables them to exercise all their powers, both mental and bodily, with the greatest advantage to their health, and with the slightest risk of producing disease, compared with the *natives*

of any other quarter of the globe. But we find that the rate of mortality of the different countries in Europe differs very much; for example, the mortality in England is about one in 45 annually, whilst in Prussia it is one in 35.

It appears, so far as statistical accounts can be depended upon, that Great Britain at the present time is amongst the healthiest countries in the world. Many circumstances conspire to render Britain a healthy country. Her inhabited rural districts are now brought to such a complete state of cultivation, that almost every source of disease is more or less done away with. Stagnant pools and marshes have been dried up; and, consequently, where rank and luxurious vegetation sprung, and died, and decomposed, to the great contamination of all the surrounding atmosphere, we have now well cultivated fields and healthy produce for the proper sustenance of man and animals. And whilst the inhabitants of Great Britain have thus forced their soil and their country into a more healthful state, and have by these means increased the general term of life, within the last forty years, to at least a third more, they have been also invigorating their systems by the healthful occupations necessary for such improvement.

The *mortality* of a country, or town, depends greatly on the nature of the climate; but there are many other causes, and especially in densely populated cities, which affect very much the general rate of mortality of every population. Even the fluctuating state of a population, regarding its increase or decrease, has a considerable effect on the ratio of its mortality; for, according to Mr Milne, the rate at which the population of England and Wales is increasing just now will diminish the *proportional mortality* at least 5 per cent. So a population which is rapidly increasing has a rate of mortality proportionally lower than one, *ceteris paribus*, which is stationary. In every population there is a fluctuating ratio of

mortality, varying according to the proportional number of deaths. In the years in which there is a greater proportional amount of disease and death than usual, the average mortality is of course high, *i. e.* the number of deaths is greater in proportion to the whole amount of the population. The rate of mortality in any place is usually reckoned by dividing the whole amount of the population by the annual number of deaths. Thus, allowing the population of London to be at the present time 1,965,600, and the annual amount of the deaths to be 46,800, the former, divided by the latter, gives the quotient 42, which is the proportion the annual number of deaths bears to the whole population, and, consequently, gives the rate of mortality as one death annually to every 42 of the population ; so, in mentioning the rate of mortality in London, we say that it is one in 42.

It has always been observed that the general rate of mortality of a country diminishes with the progress or spread of civilization and rational refinement. This fact has been nowhere so strikingly illustrated as in London. In the middle of last century the average rate of the annual mortality in the metropolis was so high as one in 20 of the population. According to the mortality tables of the present time, as shewn above, it is only one in 42 ; so the value of life in London has been doubled in the course of eighty years !

The general annual mortality has been considered nearly alike in England, Scotland, and Ireland. According to Mr Rickman, in 1780, the annual mortality throughout the whole of England was about one in 38 or 40 ; in 1790, it was one in 45 ; in 1801, it was one in 47 ; in 1811, it was one in 50 ; and in 1821, it sunk to about one in 58 or 60. So it appears that the annual mortality in England and Wales has decreased from about one in 38 to one in 58 in the period of little more than forty years. But, according to the above statements, the mortality of England is reckoned by far too low.

According to the first annual report of the Registrar-General of England and Wales, and estimating the population at 15,324,720, and the number of deaths being estimated for 1838 at 340,549, the rate of mortality at the present time is just about one in 45. But it appears from more recent reports of the Registrar, that the mortality is greatly on the decrease; and that, consequently, the value of life is increasing all over the kingdom. The mortality of the present year (1840), it is thought, will be much less than the average of former ones.

Although the mortality of France has been very much reduced within the last half century, it is still higher than that of Britain, even as compared with the Report of the Registrar-General, and which must be a near approximation to the truth. In 1781, the general annual mortality throughout France was one in 29; in 1802, it was one in 30; in 1823, one in 40. So, according to these statements, as compared with those of Britain given by Mr Rickman, the expectation of life in France is still about a third lower than it is in Britain; but compared with those of the Registrar-General, the difference is very little. So late as 1834, the mortality of France was reckoned at one in 39; however, as this estimate was made from the returns of the low countries merely, it can only be taken as an approximation to correctness.

In Prussia the annual mortality is 1 in 35—in Greece, 1 in 35—in Turkey, 1 in 30—in Austria, Spain, and Portugal, 1 in 38—in Sweden and Holland, 1 in 40—in Denmark and Germany, 1 in 42—in Switzerland, 1 in 45—in Poland, 1 in 44—in Russia, 1 in 41—in Norway, 1 in 45—in the United States, 1 in 40—and in South America it is so high as 1 in 30. In England, Ireland, and Scotland the mortality is reckoned about the same in all the three kingdoms, viz., 1 in 45.

A cold or temperate climate is most favourable to longevity; for the general mortality of countries within the torrid zone is much higher than in those without the tro-

pics. Thus, in Batavia the mortality amounts to 1 in 26—Trinidad, 1 in 27—Martinique, 1 in 28—Bombay, 1 in 20—Havannah, 1 in 23. Heberden rated the mortality of Madeira at 1 in 50.

According to the above numerical statements, Poland, Switzerland, Norway, and Britain are the four countries in which the general mortality is least, a circumstance which leads us to remark that it is just what might *à priori* have been expected; for, although the climate in these four countries differs very much in many important respects, it must be admitted that there is a striking similarity in the physical constitution and national character of the inhabitants of these four hardy nations. So Britain, notwithstanding her *consumption-engendering-climate,* her overwrought artizans, her crowded factories, and her "*pampered children,*" is one of the healthiest countries in the world. This may be the case partly from her climate, partly from the frame and constitution of her inhabitants, and most probably very much from their unwearied exertions in the improvement of the country.

In France the rate of mortality is higher than might have been expected, considering the high state of civilization to which that country has attained; but there cannot be a doubt that the restless spirit, the high national feeling, the unceasing vivacity, the political turmoils, and the over-nicety and refinement in the mode of living, all tend to shorten life. Sweden, Holland, Denmark, and Germany, are all nearly alike in their mortality; and it must be admitted that the general habits of the people in all the four nations are somewhat similar in many respects, being all of rather a retired disposition, and having participated less than any of the other nations in Europe in ecstatic feeling and political struggles. In Russia the mortality is lower than might have been expected, considering the degraded state of her lower classes. There is a striking difference in the rate of mortality of the United States compared with that of South America; but the difference is not so

great as might be expected, considering the very unhealthy nature of the most of the localities in the latter. England, Scotland, and Ireland are represented as being much about the same; but we are inclined to think that the mortality of the two latter must be greater than that of England. In the rural counties in England the average mortality is about one in 60; in the parish of Markinch, it is one in 50, but in the neighbouring parish, Leslie, it is only about one in 65. We have not the means of knowing the actual amount in any of the rural districts in Ireland.

*On the Mortality of Different Cities.*—The mortality of different cities varies as much as that of different countries. The mortality of London has been reckoned at one in 42; of Manchester, one in 30; Birmingham, one in 48; Liverpool, one in 52; Hull, one in 49; Bristol, one in 51; Leeds, one in 48; Edinburgh, about one in 34; Glasgow, one in 30; Dundee, one in 34; Dublin, about one in 34; Paris and Lyons, one in 32; St Petersburgh, one in 37; Berlin, one in 34; Madrid, one in 29; Palermo, one in 31; Leghorn, one in 35; Naples, one in 28; Nice, one in 31; Brussels, one in 26; Amsterdam, one in 24; Rome, one in 25; and at Vienna the mortality is so high as one in 22½! In New York the mortality among the whites is one in 40; among the blacks one in 19!*

According to these reports, then, the mortality of the most of our densely populated manufacturing towns is considerably below that of all the cities on the continent. Perhaps the above numerical statements, regarding the mortality of the English towns, may be considered as indicating a rate of mortality at least a sixth part too low; for, considering the imperfect records which have hitherto been kept, even of the dead buried in a regular way, there is every reason for believing that there must have been numerous omissions.

The mortality of different cities varies very much in

* Rickman, Hawkins, and others.

different years. It is stated, of 1840, that only 9000 have died in the metropolis in the last ten weeks, being, at the average, 900 per week, or about one in 42 annually of the whole population ; and which, the reader will observe, is the rate of mortality given above. In the year extending from July 1837 till July 1838, a year, however, unusually fatal to human life in London, the mortality was about one in 36. In the years from 1606 to 1610 it was one in $14\frac{1}{2}$ !

Dr Alison, in his valuable work, " On the Management of the Poor in Scotland," states, that the mortality throughout Edinburgh in 1837–8 " was more than one in 30 ;" and he says, " But if we confine ourselves to those belonging to the city of Edinburgh, we find that the burials were 2746 in a population, in 1831, of 55,200, or one in 20.1 ; and even if we suppose that population to have extended to 60,000 since that time (which I have no doubt is beyond the truth), we find a mortality of one in 21.8." But, as the Doctor says, " This is probably somewhat overstated, because a greater number of funerals from neighbouring parishes may take place in the city burying-grounds than from the city in the neighbouring parishes ; but there can be no doubt that the real mortality in the city greatly exceeds that in the neighbouring parishes, and must, therefore, have been considerably more than one in 30 in that year, probably hardly less than the mortality in Glasgow in that year, which was one in 24, and this in a town where there are hardly any manufactures, and the ordinary business of which is liable to little fluctuation." He farther states, that " In Glasgow it is perfectly ascertained that the *average* mortality since 1830 has been as high as one in 30, and that, in 1832 and 1837 (the years of Cholera and of Typhus), it was one in 21 and one in 24."

According to Dr Cleland the average mortality of Glasgow is about one in 39. But it appears that the mortality of that city has been steadily on the increase for the last fifteen years. The last year, 1838, the mortality has been

rated at about one in 22. This extraordinary increase is attributed to the great mortality from typhus fever, which was unprecedentedly fatal during the winter and spring of that year. The general increase of the mortality is attributed to the great influx of poor Irish, which is very likely to be the case; for Dr Cowan, in his "Vital Statistics of Glasgow," states, that of the admissions of fever patients into the hospital, "The Scotch were 67.76 per cent. of the total admissions. The Irish, 30.12. The English, &c., 2.10." So, according to this statement, nearly one-third of the whole admissions are Irish. Dr Cowan says, in another part of his report, that "Causes peculiar to Glasgow giving rise to fever must exist. * * * Manchester, with a population, at the last census, of 227,808, and which, in its constitution and density, must nearly resemble that of Glasgow, has been for years, and is now, comparatively free from fever. The average number treated in the Manchester Fever Hospital for seven years, ending in 1836, was 497. The annual average in Glasgow during the same period, 1842. The number treated in Manchester Hospital in 1836, was 780. The number treated in Glasgow Hospital in 1836, was 3125. Fever is now diminishing in Manchester, while it is increasing in Glasgow. * * * *

"We have proved that since 1816, but more particularly during the last 7 years, fever has been steadily increasing in the city of Glasgow, and that its victims constitute within a fraction of 55 out of every 100 patients treated in our hospitals, independently of those treated by the district surgeons within the burgh."*

Dr Cowan, after showing the great mortality, particularly amongst the young, which occurred in Glasgow in the years 1835 and 1836, from small-pox, gives the following table illustrative of "the proportion which the total deaths, and the deaths under ten years of age, bear to the popula-

* Vital Statistics, p. 11, 12.

tion at different periods, and the per centage which the deaths under ten years are of the total deaths.

| Year. | Rate of Mortality. | Rate of Mortality under 10 years. | Deaths under 10 years of age. |
|---|---|---|---|
| 1821 | 1 in 39.89 | 1 in 75.29 | 50.27 |
| 1831 | 1 in 30.91 | 1 in 60.04 | 51.48 |
| 1835 | 1 in 29.53 | 1 in 49.92 | 59.15 |
| 1838 | 1 in 26.68 | 1 in 48.07 | 55.50 |

"The above table presents but a melancholy index of the state of public health since 1821, and shows how severely, during the last two years, the augmented mortality has affected the earlier years of life."*

Dr Cowan, in his "Statistics of Fever in Glasgow for 1837," says—"The Mortality Bill of 1837 exhibits a rate of mortality inferring an intensity of misery and suffering unequalled in Britain, and not surpassed in any city that we are acquainted with on the Continent of Europe. The rate of mortality in 1832, during the prevalence of cholera, was one in 21.671, but, owing to the shorter duration of cholera, less misery and pauperism was produced by it than by fever.

TABLE

*Showing the rate of Mortality in the years specified, and from this table the still-born are excluded :—*

| Years. | Deaths. | Rate of Mortality. |
|---|---|---|
| 1822 | 3,408 | 1 in 44.43 of the population. |
| 1823 | 4,286 | 1 in 36.43 ,, |
| 1824 | 4,354 | 1 in 37.00 ,, |
| 1835 | 7,198 | 1 in 32.64 ,, |
| 1836 | 8,441 | 1 in 28.90 ,, |
| 1837 | 10,270 | 1 in 24.63 ,, |

"The above table marks emphatically the effects of poverty and wretchedness upon the rate of mortality,

* Vital Statistics, p. 32.

especially when combined with the presence of any epidemic disease."*

According to Dr Vilermé the actual mortality of Paris is one in 32. In the seventeenth century it was one in 25 or 26. In the fourteenth century it was one in 16 or 17. So the duration of human life in Paris has been doubled in the course of four centuries. During the periods in which the mortality of Paris was so high the deaths far exceeded the births, but now the reverse is the case.

According to Dr Johns, in Manchester the number of deaths in some years exceeds that of the births. During the first year of the new system of Registration, the births registered in the Manchester district were as $19\frac{1}{2}$ to 20. In the second year they were as 20.39 to 20. So the increase of the population of Manchester must be kept up by the influx of strangers.

Although the very utmost limit of human life, as terminating in extreme old age, may be nearly the same in the most of countries, we have seen that there is a very great disparity in the proportional numbers of premature deaths in the intermediate epochs of life. Statistical accounts are, therefore, most important in many respects. They point to the premature mortality of millions of our fellow beings, and, by so doing, ought to stimulate us to investigate the causes which send such numbers to an early grave. Such statements ought to be held as sacred documents, compiled as it were by the hand of time, and held up to admonish us of our ignorance regarding those laws which regulate life and death. In every country and place, there are a few who reach the allotted span of existence; but it is melancholy to think that the inhabitants of Rome, Amsterdam, Vienna, and many other places, are deprived of one-half of their chance in arriving at the final goal of human life. Such momentous differences in the rate of mortality in different countries may

* Opus Cit, p. 45, 46.

have a greater share in the causation of misery, and in the unflourishing condition of states, than has generally been supposed; for wherever there is a great proportional mortality in an increasing population, which is not materially made up by the influx of healthy strangers, there must be always an overwhelming amount of diseased and broken down individuals; and, besides, there must necessarily be a very great proportion of the young and unproductive. A community labouring under a great proportional mortality has, therefore, to grapple with death and disease, in a measure quite disproportionate to its powers of increase, in accordance with the well-being of the people. The individual interest of any country or city whatever must suffer greatly from an excess of disease and mortality; for the prosperity of a country altogether depends on the amount of its resources which can be made available by human labour; so it may be said, that in proportion to the longevity of the people is the prosperity, or, if the expression may be allowed, the *longevity* of the country.

*On the Mortality of Different Places.*—In the county of Middlesex the annual mortality is one in 47, while that of Sussex is only one in 72; and in Pembrokeshire and Anglesey the mortality is so very low as one in 83; which, according to Dr Hawkins, is the lowest rate of mortality in Europe or any where else.* In France, as in England, there is a very great difference in the rate of mortality in different places: in some districts the annual mortality is so low as one in 50, whilst in others it is so high as one in 24, or more than double. In estimating the salubrity of any place, its average rate of mortality affords the only sure criterion upon which the estimation can be made. There are some places and countries, however, which, although presenting a high rate of mortality,

* Dr Hawkins estimated the mortality of the three latter places too low, probably by about a sixth part.

have always been considered very salubrious; and, consequently, have been the resort of invalids.

When we compare the mortality of some places, on the continent, which have been always considered very healthy, with that of our own manufacturing towns, we cannot but be struck with astonishment at the great errors which have been passively cherished, in the public mind, regarding this important subject. No person ever thinks of resorting to London, Birmingham, or Glasgow, in pursuit of health and long life! No; such places have always been considered, and perhaps justly so, the depots of disease and death. But if we take four places on the continent, well known as the resort of invalids, and compare the sum of their mortality with that of four of our trading cities, we will find a considerable difference in favour of the latter.

Leghorn, Nice, Montpelier, and Pau, are four places which have always held a great reputation for salubrity; so we will now compare their general rate of mortality with that of four of our cities, but, of course, the comparison may be deemed correct or not, for the force of it depends entirely on the correctness of the numerical statements.

| | | | |
|---|---|---|---|
| In London, the annual mortality is . . . | 1 in 42 | In Leghorn, the annual mortality is . . . | 1 in 35 |
| In Birmingham, . . | 1 in 48 | In Nice, . . . . . . | 1 in 31 |
| In Liverpool, . . . | 1 in 52 | In Montpelier, . . . | 1 in 38 |
| In Glasgow, . . . | 1 in 30 | In Pau, . . . . . . | 1 in 40 |
| | 172 | | 144 |

On comparing the two sums of the above table, it appears that the mortality is at least one-sixth less in our densely populated cities than it is in the *salubrious* towns of France and Italy! And, if we compare three of the most salubrious districts in England with three of the most salubrious in France, we will find a similar result in favour of those of England.

| | | | |
|---|---|---|---|
| In Lincolnshire, the annual mortality is | 1 in 62 | In Orne, the annual mortality is | 1 in 50 |
| In Sussex, | 1 in 72 | In Sarthe, | 1 in 50 |
| In Pembrokeshire, | 1 in 83 | In Provence, | 1 in 45 |
| | 217 | | 145 |

In these three districts of the two countries the average mortality is about a third less in the English ones, a fact not generally thought of.

But although these districts in England afford the greatest chance of long life, we are not to conclude that an invalid will not be benefited by a change to some of those on the Continent. An atmosphere or climate, though not very invigorating in general, may in many cases be very beneficial, and especially in pulmonary affections—wherefore the great temporary relief often obtained in such complaints by a change from our island to some places on the Continent. A removal, say from Pembrokeshire to Provence, may be often of decided advantage to the invalid, if the change be consistent with the nature of the complaint.

In order to derive any advantage from removal to a different climate, in consumption and other pulmonary complaints, it is necessary that the change should be to one of softness and humidity. In the south of England, *Undercliff*, *Hastings*, and *Brighton*—in the south-west, on the coast of Devonshire, *Sidmouth*, *Exmouth*, and *Torquay*—and *Penzance*, in Cornwall, are all places which have been highly recommended in pulmonary diseases. In France, *Pau*, *Toulon*, *Marseilles*, *Montpellier*, *Avignon*, *Nice*, &c. &c.—in Italy, *Genoa*—*Madeira*, the *Canaries*, and many of the islands and places of the Mediterranean, have all had their share of reputation as being favourable climates for consumption and other diseases of the lungs. But it is somewhat remarkable that, in some of these places, pulmonary consumption is rather prevalent as an *endemic* disease. This may be attributed to the humidity of the atmosphere; for in most of the above-mentioned

places a considerable quantity of rain falls. For example, in Penzance, double the quantity of rain falls than in London; yet its climate is considered next to that of Madeira in point of salubrity. Humid close atmospheres give rise to pulmonary consumption, whilst dry bracing atmospheres give rise to the different kinds of *angina*, or dry catarrhs. Pulmonary consumption is much more prevalent in the west of Scotland, about Glasgow, than in the east, about Edinburgh and in Fife. So it appears, that although a mild humid atmosphere has some effect in preventing the rapid development of tubercles in the lungs in those already partially affected, it also engenders a liability or disposition to the disease in those constantly under its influence. Those who are either affected with consumption, or who may be only predisposed to it, will obtain some relief, and perhaps exemption from the accession of the disease for some years, by residence in a mild moist climate, in consequence of the *miliary tubercles* in the lungs not being excited to such a rapid development as would be in a colder and drier atmosphere. Pulmonary consumption, however, occurs in every kind of climate: in a mild and moist climate, it is slow in its progress; in a changeable dry climate, where there is much variation from heat to cold, its progress is somewhat irregular, but generally rapid; and in changing from the former to the latter, the disease is very much accelerated, and goes on to a very rapid termination—the reverse is the case when the change is from the colder to the milder climate.

According to Mr Farr, the prevalence of *phthisis*, or consumption of the lungs, in any district, is not a sure sign either of general unhealthiness or a great proportional mortality; for it appears that wherever the proportion of deaths from consumption is high, compared with the general mortality, the whole mortality is low; and the whole mortality from consumption itself is low. Such being the case, we are led to conclude that the general expectation of life is at least as great in those districts in which con-

sumption of the lungs is more prevalent as in any others; but, of course, the expectation or value of life will be much less in all those individuals peculiarly predisposed to the malady. Hence the benefits which often accrue to individuals predisposed to consumption by removal to a more genial climate.

*Mortality of the whole World.*—Dr Casper, from his estimation of the numbers of the human race, and of the average mean duration of life throughout the whole world, calculates that at least 29,000,000 of human beings die every year, 80,000 every day, 3,300 every hour, and 53 every minute. Surely such statements must strike every one with astonishment. Every person of reflection must involuntarily say to himself, *How transient may my existence be!* Truly our life is held upon precarious chances! When we reflect on the extraordinary productive and destructive powers of nature, we are led to exclaim with Dr Casper, "What, then, are wars, and pestilences, and battles, and earthquakes, to the great household of creative nature!"

# CHAPTER X.

## PART I.

### On Death at the different Periods of Life.

It is not enough to say that human life is short even at the longest age, for this implies that there is a considerable chance of an individual arriving at that period which marks the utmost stage of man's mortal existence. No, an individual must not look forward to the prospect of arriving at old age in the bare estimation of regular chance. He must, in order to estimate the probability of such with correctness, consider all those individual circumstances in reference to age, constitution, present health, means of living, employment, accidental occurrences in life, liability to disease, and all the various physical and moral influences which affect us as extraordinary organized and civilized beings. When an individual arrives at a certain age—say, when he has survived the periods of infancy and childhood, and is in possession of tolerable health—the *probability* of that individual's life will be greater than it was in infancy, as compared with the value of life estimated from all ages. But although a mature age may denote, in some measure, a greater probability of life, it does not denote to any individual a regular chance of any corresponding duration of existence, for that altogether depends on individual peculiarities of body and constitution, and upon casual occurrences in respect to disease and other causes of premature death.

In the primitive stage of man's existence upon earth, and perhaps during the patriarchal age, the duration of life might not be so precarious as it is now; for then the human race lived chiefly in a natural state, and were, con-

sequently, almost exempted from many of those fatal diseases which have always been so prevalent in civilized nations. Under such circumstances, then, the probability of life at all ages during these periods might be much greater than it is now, and man would more generally die in the regular dissolution of all his faculties from extreme old age. It appears that fatal casualties and diseases are so very generally and regularly distributed amongst the mass of mankind, that their effects upon any given number prove very equal—that is, that the average duration of life, say of any 1000 born, will be, *ceteris paribus*, nearly the same as that of any other 1000. So the chance of life, although very unequal to different individuals, is almost a uniform result to a community at large; but still it must not be forgotten that it is modified in every community according to all the prevailing influences over the health of the inhabitants.

Life may be divided into three grand periods—namely, youth, which extends from infancy to puberty; maturity, which extends from puberty to the commencement of age; and old age, which is the natural advance to the termination of the life of man. During infancy life is very precarious from the many diseases or affections to which this age is peculiarly liable, and the mortality is consequently very great, far exceeding that either of early youth, or of mature age. In early youth, life is also very precarious, from many of the fatal diseases common to infancy, and likewise from fatal causes and diseases more peculiar to youth itself. The mature periods of life are generally more exempted from fatal diseases than the epochs of infancy and childhood; but still they are associated with many serious maladies which too frequently prove fatal. With age the ratio of mortality rapidly increases; for, as the system becomes more enfeebled and changed, diseases and all the other direct causes of death prove both more surely and rapidly fatal: and in extreme old age it may be said that the downward progress of man to mortality is very rapid indeed. Nature has set the utmost limit to human exist-

ence, as terminating in the decrepitude of age; but within that limit death occurs prematurely at all ages, and thus fixes a final goal to every individual. The duration of life, then, is very variable, being the result merely of circumstances, because drawn from amongst all the accidental occurrences of life. There seems no very striking uncertainty in human life when viewed in the mass; but, considered in relation to individuals, the uncertainty is very great indeed, there being so many chances against the probability of an individual surviving a certain age.

Although the final period of man's existence is now limited to about *threescore years and ten*, there have been many instances of individuals having attained more than double that period. Sir John Sinclair, in his work on Longevity, gives the following list of a few who arrived at great ages: —Isbel Walker died at the age of 112, and Peter Lardner at 131, both in Aberdeenshire, Scotland. Catherine, Countess of Desmond, county of Waterford, lived to 140; she renewed her teeth twice or thrice. Thomas Parr, Shropshire, lived to 152, and Hendry Jenkins, Ellerton, Yorkshire, to 169 years. Sarah Roven, aged 164; John Roven 172; they were both born and died at Stadover. Their youngest son reached the age of 116. Petratsch Zartan, in Hungary, reached the advanced age of 185—he was a peasant. There are many other instances on record of individuals having reached great ages, but the above-mentioned are sufficient to give the reader an idea of the advanced age which some have attained to. It is said that more live to an advanced age in the metropolis and Essex than in any other places in England. In Russia instances of longevity are very common. In the report of the Holy Synod, 1827, it is mentioned of 848 men who professed the Greek religion that had reached upwards of 100 years of age—32 had passed their 120th year, four their 130th year. Of 606,818 men who died in 1826, 2785 were above 90, 1432 above 95, and 818 above 100 years of age. Among this last number 88 were more than 115, 24 more than 120, seven were above 125,

and one had attained the age of 160. It is said that the Arabs in the desert live 200 years.*

According to Dr Hawkins, the expectation of life at all the different ages is increasing very fast.

In Rome, in the third century of the Christian era, the expectation of life, "From birth to 20, was 30 years; from 20 to 25, 28 years; from 25 to 30, 25 years; from 30 to 35, 22 years; from 35 to 40, 20 years; from 40 to 45, 18 years; from 45 to 50, 13 years; from 50 to 55, 9 years; from 55 to 60, seven years; from 60 to 65, five years. The computation did not extend beyond this.

"It is certainly gratifying to compare the above with the results of modern researches on the probability of human life. At 20 years of age, Mr Finlayson shews us a probability of 40 years; at 40, he allows 29 years; at 50, he promises 22 years; at 60, he admits 15 years!" †

According to the important investigations of Mr Finlayson, it appears that although the general mortality throughout England and Wales has decreased very fast during the last century, the decrease has not been equal neither in the different periods of life nor in the two sexes; "for while the mortality among youths and adult men seems to have remained nearly stationary for the last fifty years, that among girls and women has decidedly decreased.

"Mr Finlayson has also compared with great care the average duration of life in persons who had insured during the 17th and during the 18th centuries, and he has found that in the course of 96 years there has been a gain of—

| | | | | |
|---|---|---|---|---|
| 10 | years | at the age of | 5 | years. |
| 9 | ,, | ,, | 10 | ,, |
| 9 | ,, | ,, | 20 | ,, |
| 8½ | ,, | ,, | 30 | ,, |
| 7 | ,, | ,, | 40 | ,, |
| 5 | ,, | ,, | 50 | ,, |
| 3 | ,, | ,, | 60 | ,, ‡ |

* Million of Facts. † Hawkins' Elements of Medical Statistics.

‡ Medico. Chirurg. Review, April 1840.

The following table, from Mr Rickman's population returns, shows the number of individuals living at different ages in a supposed given proportion of 10,000 males and 10,000 females :—

| | Males. | | | Females. | | |
|---|---|---|---|---|---|---|
| | England. | Wales. | Scotland. | England. | Wales. | Scotland. |
| Under 5 years, | 1538 | 1514 | 1494 | 1444 | 1382 | 1294 |
| 5 to 10 | 1343 | 1407 | 1357 | 1268 | 1281 | 1177 |
| 10 to 15 | 1167 | 1210 | 1247 | 1056 | 1093 | 1057 |
| 15 to 20 | 988 | 1009 | 1032 | 995 | 1003 | 1048 |
| 20 to 30 | 1470 | 1433 | 1490 | 1684 | 1560 | 1769 |
| 30 to 40 | 1155 | 1109 | 1095 | 1210 | 1163 | 1204 |
| 40 to 50 | 941 | 871.4 | 895.4 | 936.6 | 911.6 | 937.9 |
| 50 to 60 | 665.6 | 646.3 | 649 | 653.3 | 672.6 | 711.1 |
| 60 to 70 | 447.6 | 474.8 | 458.1 | 458 | 535.5 | 502.2 |
| 70 to 80 | 221.9 | 243.6 | 216.3 | 228.2 | 281.4 | 225.5 |
| 80 to 90 | 56.25 | 74.90 | 58.22 | 64.85 | 104.76 | 65.18 |
| 90 to 100 | 4.15 | 7.54 | 6.71 | 5.75 | 10.95 | 7.42 |
| 100 and upwards, | .12 | .09 | .43 | .22 | .50 | .60 |

By running along the lines of the above table it will be seen that there is a greater proportion of children in Eng-

land under five years of age, than there is either in Scotland, or Wales; which shows that, in England, there must either be greater care taken of the young, or the climate must be more congenial to infancy and childhood. Both circumstances may diminish the mortality during this period. In England, children are generally reared with greater care than in Scotland; and, notwithstanding their pampered appetites, they seem to be less subject to fatal diseases. But in England the climate is not so rigorous; consequently, children may be more exposed to the open air with less danger, and certainly with great advantage to their general health. From five to ten years of age, England has also the advantage in the above respects. But from fifteen to twenty, and from twenty to thirty, Scotland seems to be superior to both England and Wales. From thirty to fifty, England is superior, but Scotland is higher than Wales. From fifty to sixty the three are nearly equal. From sixty to seventy, the greatest number living is in Wales, but Scotland stands higher than England. From seventy to eighty, and from eighty to ninety, England and Scotland are about equal, whilst Wales is considerably higher than either. From ninety to one hundred, the numbers are as five, nine, seven, in the order of the table. But, above one hundred, Scotland is nearly double Wales, and Wales nearly double England. So the above table shows that even in these three divisions of the same kingdom there is a considerable difference in the general rate of mortality in different periods of life. But the difference, it seems, is much greater even in particular years of life than in others. This singular fact has been pointed out by Dr Olinthus Gregory. In his Lecture on the Mortality of London, in the Royal Institution last April (1840), he stated that about double the number of deaths occur at the ages of thirty-nine and forty-one, *than in the intervening year*, and such is the case also in *the years* before and after fifty, sixty, and seventy.

The rate per cent. of mortality at different ages also

varies considerably in different places even of the same kingdom, as is shown by the following table :—

TABLE

*Of the rate per cent. of Mortality under 5 years of age, and under 20 years :—*

| | Under 5 years. | Under 20 years. |
|---|---|---|
| In London there dies | 38 per cent. | 46 per cent. |
| Bolton ,, | 49 ,, | 61 ,, |
| Norwich ,, | 42 ,, | 50 ,, |
| Holbeck ,, | 50 ,, | 62 ,, |
| Bradford ,, | 47 ,, | 59 ,, |
| Leeds ,, | 53 ,, | 62 ,, |
| Wigan ,, | 48 ,, | 59 ,, |
| Beeston ,, | 39 ,, | 52 ,, |
| Rutland ,, | 29 ,, | 37 ,, |

According to the law of mortality at Carlisle, of 10,000 born, 8,461 reach the end of the first year; 7,274 reach the end of the third year; 6,400 the twelfth year; 6,090 the twentieth year; 5,642 the thirtieth; 5,075 the fortieth; 4,397 the fiftieth; 3,643 the sixtieth; 2,401 the seventieth; 953 the eightieth; and 30 the ninety-fifth year.

In Liverpool, Glasgow, Leeds, &c., the proportion of deaths between the age of 20 and 30 is 16; and between 30 and 40, 18.

According to the Registrar-General, throughout England and Wales, of 1000 deaths, 145 have been at the age of 70 and upwards, but in the North Riding of Yorkshire and in Durham, not including the mining districts, the proportion has been so high as 210. And in Northumberland, not including the mining districts, in Cumberland, Westmoreland, and in the North of Lancashire, the proportion has been 198; in Norfolk and Suffolk 196; in Devonshire 192; and in Cornwall 188. But the proportion is much smaller in those places where the popula-

tion is densely crowded. In the Metropolis it is 104; in Birmingham 81; in Leeds 79; and in Liverpool and Manchester it is so low as 63. Such numerical statements show the decided difference of the value of life in different places, and particularly so in comparing the proportions in the thin and more densely populated districts with each other.

The following quotation, derived from Dr Johns' paper on the Statistics of Manchester, shows the comparative rates of mortality betwixt different ages in England and Wales with that of the Metropolis, and some of the other principal towns:—"With regard to the comparative mortality in Manchester and other towns, the following results are highly interesting. The returns quoted are from the Registrar-General's Report, with the exception of those from Liverpool, which have been supplied by the Superintendent-Registrar in that town, for the year 1837-8. Deaths at 3 years and under—England and Wales 37.08, Metropolis 38.13, Birmingham 41.08, Liverpool 43.64, Manchester 44.46. Deaths at 15 and under—England and Wales 9.75, Metropolis 8.42, Birmingham 9.64, Liverpool 9.95, Manchester 9.50. Deaths at 20 and under—England and Wales 3.67, Metropolis 2.47, Birmingham 3.93, Liverpool 2.76, Manchester 3.27. The great mortality among children under 2 years of age is not directly chargeable to the factory system. (The mortality from 16 to 20 is greater in Birmingham than in Manchester, for those are the two places especially contrasted.) To what cause, therefore, may it be attributed? To no one in particular. The manners and habits of the people have much to do with it. The most plausible reason appears to be, that young children are not sufficiently taken care of by their mothers, who during pregnancy continue as long as possible at their work, and attend the factories sooner than they ought after their confinement, leaving their infants to the care of ill-paid and unsuitable persons."

TABLE

*Showing the proportion of Deaths at different ages, in England and Wales, out of* 10,000 *Deaths of Males, of Females, and of both Sexes, according to the Registers of Burials* 1813–30, *and according to the Registers of Deaths for the year ending June* 30, 1838:—

| AGE. | REGISTERS OF BURIALS. | | | REGISTERS OF DEATHS. | | |
|---|---|---|---|---|---|---|
| | Males. | Females. | Both Sexes. | Males. | Females. | Both Sexes. |
| Under 1 year | 2188 | 1756 | 1975 | 2339 | 1933 | 2140 |
| 1 to 4 | 1498 | 1450 | 1474 | 1742 | 1780 | 1760 |
| 5 to 9 | 437 | 410 | 424 | 457 | 462 | 460 |
| 10 to 19 | 579 | 636 | 607 | 554 | 647 | 559 |
| 20 to 29 | 724 | 839 | 781 | 738 | 833 | 785 |
| 30 to 39 | 621 | 725 | 672 | 655 | 715 | 683 |
| 40 to 49 | 649 | 670 | 659 | 653 | 632 | 643 |
| 50 to 59 | 715 | 784 | 700 | 656 | 621 | 638 |
| 60 to 69 | 911 | 922 | 917 | 813 | 823 | 818 |
| 70 to 79 | 1012 | 1086 | 1049 | 830 | 883 | 856 |
| 80 to 89 | 584 | 700 | 641 | 473 | 556 | 514 |
| 90 & upwards | 75 | 116 | 95 | 94 | 115 | 104 |

First Report of the Registrar-General for England & Wales, 1839.

So, in England and Wales, according to the above table, in the first year of life the mortality of both sexes, as compared with that of all ages, is about one-fifth, or 20 per cent.

| | | | | |
|---|---|---|---|---|
| From 1 to 4 years | it is | 1-6, | or about | $16\frac{3}{4}$ per cent. |
| 5 to 9 | ,, | 1-22, | ,, | $4\frac{1}{2}$ |
| 10 to 19 | ,, | 1-18, | ,, | $5\frac{1}{2}$ |
| 20 to 29 | ,, | 1-13, | ,, | $7\frac{3}{4}$ |
| 30 to 39 | ,, | 1-14, | ,, | 7 |
| 40 to 49 | ,, | 1-15, | ,, | $6\frac{3}{4}$ |
| 50 to 59 | ,, | do., | ,, | $6\frac{3}{4}$ |
| 60 to 69 | ,, | 1-12, | ,, | $8\frac{1}{4}$ |
| 70 to 79 | ,, | 1-11, | ,, | 9 |
| 80 to 89 | ,, | 1-19, | ,, | 5 |
| 90 and upwards | | 1-96, | ,, | 1 |

These tables, representing the amount of the mortality in extreme old age as compared with that of infancy, show that the number of deaths occuring above the age of 90 is only as 1 to 20, and so on in a smaller ratio in respect to all the other periods of life; but of course varying according to the general rate of mortality in the different epochs.

We have no well substantiated accounts of the proportion of deaths in the different periods of life among the uncivilized tribes; but from their cruel and barbarous practices toward mothers and their offspring, we are inclined to think that the mortality in early life must be high; for we have already seen that infanticide is very common in savage countries: and circumstances lead us to think that the proportional mortality will also be greater in the periods of adolescence and manhood. Amongst those tribes, however, the young who survive must be very hardy, because they are brought up to almost every accidental exposure with their parents; and are thus habituated from their very infancy to those impressions which would otherwise act very injuriously, and, consequently, would tend to increase the mortality of this age independent of all other causes. In youth and manhood, party contests, irregular living, and the various casualties of savage life, must thin the number greatly. It appears also that the effects of general tear and wear of the system become much sooner apparent, in the manifestations of old age, amongst the uncivilized tribes. Dr Robertson is of opinion that the duration of life at all ages is very short amongst the American Indians; and, according to Creuxius, very few of them reach the mature periods of life.

*The Expectation of Life* at the different ages has been calculated from so many different observations upon mortality, that all the tables which have hitherto been compiled upon the subject differ more or less in their results as to the number of years which any individual of a certain age may expect to live.

The following abstract of different tables upon the subject is taken from the volume on "PROBABILITIES," in the Cabinet Cyclopædia, by Mr Augustus De Morgan. The side columns represent the different ages; the others represent the number of years, with decimal parts, which each table gives as the expectation of life to the corresponding ages:—

| Years of Age. | De Moivre's Hypothesis. | Northampton. | Amicable. | Carlisle. | Equitable. | Government. | | Years of Age. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Males. | Females | |
| 0 | 43.0 | 25.2 | | 38.7 | | | | 0 |
| 5 | 40.5 | 40.8 | | 51.3 | | 48.9 | 54.2 | 5 |
| 10 | 38.0 | 39.8 | | 48.8 | 48.3 | 45.6 | 51.1 | 10 |
| 15 | 35.5 | 36.5 | | 45.0 | 45.0 | 41.8 | 47.2 | 15 |
| 20 | 33.0 | 33.4 | 36.6 | 41.5 | 41.7 | 38.4 | 44.0 | 20 |
| 25 | 30.5 | 30.9 | 34.1 | 37.9 | 38.1 | 35.9 | 40.8 | 25 |
| 30 | 28.0 | 28.3 | 31.1 | 34.3 | 34.5 | 33.2 | 37.6 | 30 |
| 35 | 25.5 | 25.7 | 27.7 | 31.0 | 30.9 | 30.2 | 34.3 | 35 |
| 40 | 23.0 | 23.1 | 24.4 | 27.6 | 27.4 | 27.0 | 31.1 | 40 |
| 45 | 20.5 | 20.5 | 21.1 | 24.5 | 23.9 | 23.8 | 27.8 | 45 |
| 50 | 18.0 | 18.0 | 17.9 | 21.1 | 20.4 | 20.3 | 24.4 | 50 |
| 55 | 15.5 | 15.6 | 15.1 | 17.6 | 17.0 | 17.2 | 20.8 | 55 |
| 60 | 13.0 | 13.2 | 12.5 | 14.3 | 13.9 | 14.4 | 17.3 | 60 |
| 65 | 10.5 | 10.9 | 9.9 | 11.8 | 11.1 | 11.6 | 14.0 | 65 |
| 70 | 8.0 | 8.6 | 7.8 | 9.2 | 8.7 | 9.2 | 11.0 | 70 |
| 75 | 5.5 | 6.5 | 6.2 | 7.0 | 6.6 | 7.1 | 8.5 | 75 |
| 80 | 3.0 | 4.8 | 5.0 | 5.5 | 4.8 | 4.9 | 6.5 | 80 |
| 85 | 0.5 | 3.4 | 4.0 | 4.1 | 3.4 | 3.1 | 4.8 | 85 |
| 90 | | 2.4 | 2.9 | 3.3 | 2.6 | 2.0 | 2 8 | 90 |
| 95 | | .8 | 1.4 | 3.5 | 1.1 | 1.2 | 1.6 | 95 |
| 100 | | | | 2.3 | | | | 100 |

It will be observed that, although some of the above tables vary considerably in the beginning and end of life, they are all pretty nearly the same about the age of 45.

The Government Female Table is higher than any of the others up to the 85th year; and the Carlisle Table is higher than all the rest above the last-mentioned age. The Carlisle Tables are considered the best; they have been constructed from the general mortality of that town, by Mr Milne. The Government Tables were constructed by Mr Finlayson, from various tontines; consequently they may be considered as representing *picked* or *good* lives. The Equitable were constructed upon the records of 5000 deaths. The Amicable were founded on 63 years "experience" previous to 1831. The Northampton were constructed by Dr Price, from the mortality of that town, in the years 1741-1780. "De Moivre's Hypothesis was suggested by Halley's Breslau Tables * * of the mortality of that town, in the years 1687-1691. It confessedly errs considerably at the beginning and end of life."*

As life is usually divided into certain periods and epochs, according to the important changes which take place in the system with its growth to maturity, and also with its decay in the advancement of years, it will be advantageous to exhibit a general table of these before entering particularly into the consideration of the many changes and circumstances which, at the different periods of life, necessarily influence the system in respect to the different causes of disease and death.

*Table of the different Periods and Epochs of Life.*

"I. Period, *or that of Infancy* (divided into two epochs).
1st Epoch, to the commencement of the first dentition (teething).
2d Epoch, from the commencement to the completion of the first dentition.

II. Period, *or that of Childhood.*
Extending from the completion of the first to the completion of the second dentition.

* See Cabinet Cyclopædia, volume on "Probabilities." By M. D. Morgan.

III. Period, *or Boyhood—Girlhood.*
From the seventh or eighth year to the commencement of puberty.

IV. Period, *or Adolescence.*
Commencing with the first appearance of puberty, and extending to adult age.

V. Period, *Adult Age.*
1st Epoch, or early adult age, or confirmed virility.
2d Epoch, or mature age.

VI. Period, *Declining and Old Age.*
1st Epoch, declining age.
2d Epoch, green old age.
3d Epoch, advanced old age, ripe old age.
4th Epoch, decrepitude, second infancy."*

Although the above table may be taken as a guide in considering the most common causes of death in the different periods of life, it will not be necessary to adhere to all its subdivisions; so we will confine our observations chiefly to the six grand periods—only touching on some particulars which may refer to the different epochs.

### 1st *Period—Infancy.*

In infancy all the bodily functions are so easily performed that any derangement of them is scarcely to be expected; but no sooner is the little being exposed to the vicissitudes of its future element than it becomes obnoxious to the various influences and causes which, under particular circumstances, produce disease and death. The skin, in infancy, is so very susceptible of external impressions, that a great many infantile complaints arise from undue exposure of the body to cold; but even in early infancy we have also very serious and fatal diseases arising from what may be termed internal causes, namely, from irritation of the stomach and bowels, brought on either from morbid accumulations, or from unhealthy milk or aliment. In infancy the bowels are very susceptible of every stimulus, conse-

* Copland's Medical Dictionary.

quently, when they are irritated, an abundant secretion from their mucous membrane takes place from the increased action of their vessels. This secretion, at first, is a very salutary effect, because it relieves the distended blood vessels, and, consequently, reduces the increased vascular action of the parts. Now, if *bowel complaints* in infancy were only attended to at first, they might be very easily cured by a little attention in avoiding their exciting causes. The infant, however, is suckled, and fed, and nursed as usual—*it has only got a bowel complaint*, in the common acceptation of the term. In a short time, however, it assumes a very sickly appearance—it gets thinner—the features become altered in animation—the limbs and all the rest of the body get much softer—the belly appears swelled, and may feel hard at different parts—it refuses suck, and has gone entirely from its sleep: and the pale shrunk features, the suspirous breathing, the clammy skin, and the suffused eye, all indicate approaching dissolution. Such striking changes, from such apparently simple causes, certainly appear rather wonderful, but the study of the vital functions leads to an easy solution of the case. The fatal consequences are traced from the intestinal irritation first weakening the powers of the system by the constant secretion; and, secondly, from the whole nervous system participating in the irritation of those nerves more particularly affected by the complaint—thus bringing on a general irritation and debility of the whole nervous system. In consequence of this depletion and irritation, the normal functions of the nervous and vascular systems become completely deranged, which gives rise to congestions and obstructions; the blood being driven in greater quantities to some parts than to others, and especially to those of a glandular nature. The abdominal glands thus become inflamed and enlarged, which prevents the absorption of the nutritient parts of the food; hence the great depression and weakness of the vital powers in all cases of protracted bowel complaints. So this unhealthy state of

the system, brought on by irritation and the want of nutrition, comes to affect the brain, lungs, and heart, in their turn; giving rise to all the alarming symptoms too well known, in these cases, to precede dissolution.

Another very common source of fatal disease, in infancy, is the lungs. We have seen in Chapter II., *catarrhal fever*, that the mucous membrane, which lines the air tubes is particularly liable to become inflamed from any sudden exposure to cold. In inflammation of the *bronchi* or air-tubes in infants the lining membrane is the chief seat of the disease; but as the inflammation advances, it gives rise to great congestion of the whole lungs, followed by an abundant secretion from the bronchial membrane. Under these circumstances the breathing is performed with great difficulty, and the blood is not purified of its *carbonaceous* principles; and, being thus sent to the brain and other parts of the system in an impure state, gives rise to all those morbid symptoms usually attendant on severe inflammation and congestion within the chest. The difficult breathing—the incessant expansion of the nostrils—the pale countenance—and the distended veins are all very prominent symptoms and effects of pulmonary congestion, accompanied with diminished energy of the brain, and of the whole nervous system. The first stage of the complaint being marked by these signs of congestion, we are led to anticipate what generally follows. No sooner has the active or inflammatory stage run its course than it is followed by a copious secretion from the bronchial mucous membrane, which, if not speedily checked by appropriate treatment, accumulates in the air passages, and suffocation or death from *asphyxia* is the result.

In other cases of infantile complaints the brain and spinal marrow may be the source of the disease, from which result a different set of symptoms entirely. At the commencement there may be either extreme restlessness, or drowsiness, with quickness or suffusion of the eyes, just according to the part of the brain affected, and conse-

quently according to the effect produced upon the rest of the nervous system. If the primary effects should be such as to blunt all at once the nervous susceptibility, we will have all that stupor and listlessness characteristic of the last stage of water in the head, or effusion in the brain. But if the irritation or inflammation of the brain should continue for some time without effusion taking place, the bad effects may be manifested in the occurrence of convulsions and other nervous symptoms.

*The second epoch of infancy* is attended with the same danger from the accession of the diseases, at which we have already hinted, but, perhaps, they are not so apt to occur from slight causes, as the system has now acquired more firmness and vigour. But during this epoch all diseases in children are very much influenced by teething, a process of itself always accompanied with considerable irritation, and very frequently with great danger. Indeed we may say that every disease occurring at this period is rendered doubly precarious by dentition, often ending suddenly in convulsions from the great irritation communicated to the nervous centres.

That the mortality in infancy is greatly influenced by physical causes, perhaps chiefly referrible to locality, will appear evident from the following statement:—" There is a great difference in the proportion of deaths in infancy throughout England. In Shropshire, Cambridgeshire, Huntingdonshire, in Leeds and its suburbs, in the mining districts of Staffordshire, and in the lowland parts of Lincolnshire, the deaths of infants under one year have been fully two hundred and seventy in every thousand deaths of all ages; while, in the northern districts of England, as Dorsetshire, Devonshire, Wiltshire, in Herefordshire, and in Wales, the deaths at that age out of one thousand at all ages have only been about one hundred and eighty.*

* First Report of the Registrar-General, 1838.

The mortality during infancy, or under two years, is very great, being more than one-fourth of the whole number of deaths throughout the different ages. The most fatal complaints are inflammation of the lungs and bowels, various bowel complaints, convulsions, infantile decline, water in the brain, worm fever, and teething. The mortality of children is supposed to be much smaller in the country than in villages, and much greater in large towns than in either. But according to M. Quetelet, the Belgian statist, the difference is not very great. He has shewn that of 10,000 male children born in the Belgian cities, the deaths in the first year were 2574, while of the same number born in the country the deaths were 2425; and the difference he found to be less amongst female children.

The mortality in infancy and the first epochs of childhood, though still very great, appears to be much on the decrease. According to Mr M'Culloch, in London, during the 20 years ending with 1749, out of 100 born, 74 died under five years of age; while, in the 20 years ending with 1829, only 31 died in the same number. Quetelet says, that one-tenth of the infants which enter the world die in the first month, and that nearly one-fourth die in the first year!

### *2d Period—Childhood.*

*Childhood* extends from the second to the seventh year. The period of childhood is perhaps the most interesting one in the whole course of life. The little being is gradually emerging from its passive existence; it is daily becoming a creature of observation and intelligence, and is always busy in its own circle of investigations. At this period, as has been said by a very celebrated nobleman, we have "a curious little animal," eager in all its intentions, wayward in all its actions, and yielding only a forced obedience even to parental authority. The little being is always wafted on the wings of curiosity, consequently it becomes more and more obnoxious to the

dangers and vicissitudes of existence: it is liable to accidents in a thousand ways from its heedless temerity; and it is doubly more so to numerous diseases, which too often nip the growth of childhood. But even at this early period nature has begun to admonish her child of death, in one of its constituent parts: the first teeth begin to drop out, which renders the little being no longer the possessor of its primitive attributes. Now the system is gradually becoming more robust, and every object excites the activity of the intellectual faculties: the child is daily becoming more intelligent and less instinctive—its instinctive mind *dies* as its intellectual one advances! During this period children, besides being liable to the diseases which affect adults, are almost certain of being assailed with the numerous class peculiar to their age. These are measles, scarlet-fever, small-pox, watery or chicken-pox, and many other eruptive complaints. Then we have hooping-cough, catarrhal-fever, water in the head, and a great many different bowel complaints. Although these diseases often prove fatal, yet the deaths in this age are much fewer than in the period of infancy, being less than the one-half. This decrease in the mortality must be owing to the system having acquired greater vigour in childhood, and consequently to its being more able to resist the shocks of disease. The diseases of childhood are more easily discovered than those of infancy; for the little sufferer is quick enough, in many cases, to point out the seat of its complaint; which must assist very much in directing a proper system of treatment. The greatest number of children are cut off from epidemical diseases, such as catarrhal-fever, scarlet-fever, remittent-fever, measles, and hooping-cough; but a very great proportion die from affections of the bowels, and water in the head.

### *3d Period—Boyhood, Girlhood.*

In this period, which extends from the seventh year to the commencement of puberty, all the functions are in

very active operation. The growth both of the body and of the intellectual faculties have confirmed the development and manifestations of the future man, or woman. During this period all expectancies regarding health, manners, conduct, and intellectual attainments, are built upon the unsophisticated appearances of these respective attributes. The system at this period is generally vigorous in all its operations, but is still liable to many of the diseases which affect childhood. This age is also very liable to continued fevers, inflammation of different parts, enlargement of the joints and glands, water in the head, consumption, cutaneous eruptions, diseases of the spine, and nervous affections, as *epilepsy*, *chorea*, *&c.*

During boyhood and girlhood the system is very liable to be tainted from unhealthy causes. Sleeping in damp and crowded apartments often engenders many diseases, and too much confinement cannot fail in bringing on both weakness of body and listlessness of mind. Indeed, in this age, death is very often a direct consequence of an *enfeebled* constitution being unable to resist the shock of active disease.

The mortality in this age is less than in any other, being not one-fifth part of that in infancy, and not above one-twentieth of the mortality of all ages. Such a decrease in the mortality in this age may be accounted for in many ways. The natural propensities of the boy, and girl, are not so easily suppressed as they are either in childhood or in mature years. The individual has acquired that much self-command, that he is able to a certain extent to follow the dictates of his mind as to all natural amusements and recreations. By such means the schoolboy preserves the equilibrium of all his bodily functions, and at the same time his mind is excited into healthy action, all of which enable him to stand against many adverse causes which would inevitably prove hurtful to a system not thus invigorated. So in this age we have a decided example of the great superiority of natural

habits, in producing health and in fortifying the system against disease, over those of an artificial kind; for where do we discover, amongst the whole mass of animated beings, a single example of restraint and confinement being conducive to their wellbeing? In this epoch one would be apt to consider life in much greater danger, from the various accidents which might occur both from temerity and the want of knowledge; but the healthy operations of the whole system have set up, as it were, a bulwark to ward off the encroachments of disease: this period of existence may, therefore, be reckoned the most healthy of all. And according to the strength and healthful state of the system, we may reckon on the probable advancement of years to the individual; for this is the period when the manifestations of congenital diseases generally appear: an individual, therefore, who has passed through this stage, with a sound and vigorous body, is very likely to continue so through the most of his life; but, of course, will be liable to all the casual diseases of human nature.

### *4th Period—Puberty or Adolescence.*

The flower of life, or period of adolescence, extends to about the twenty-fourth year of males, and the twentieth of females. The mortality in this age is rather greater than in the preceding, which can be easily accounted for, when we consider the many liabilities of this important period.

In adolescence we have all the alacrity and buoyancy of youth, but, perhaps, a little suppressed and softened off by the gradual influence of good example and judicious tuition. The system has become changed both in relation to its innate propensities and feelings, and the mental faculties have also become unfolded to many of the imposing pleasures of life; all of which too often beshrew the youthful individual, by giving rise to fond hopes and anxious anticipations regarding the events, and wishful pleasures, of future life. New desires thus spring up,

to every incentive cause, and the motive is, perhaps, effaced as quickly as it was conceived: the mind is thus kept continually upon the stretch from the different passions, and from mental anxiety. At this age, love, hope, fear, and ambition, all conspire to wring the youthful breast: and education, the softener of Nature's charms, even in the fine arts and elegancies of life, also tends to distract the mind and to render the whole nervous system more susceptible of all those impressions which tend to produce an over excitement of the system generally. Perhaps such observations may be applied more directly to the female sex than to the male; for at this period the latter have generally commenced their probationary career in worldly pursuits, and thus, to a certain extent, their mind is directed to those secular duties which prove the most healthful stimuli to the salutary actions both of mind and body. During this epoch of life, as well as in that of boyhood and girlhood, the growth of all the mental and corporeal faculties proceeds very rapidly, consequently all those influences, which exert a pernicious ascendency over any of the functions either of the mind or body, must greatly affect their full and natural development. Such being the case, individuals at this age ought to take a considerable amount of exercise in the open air; for by such means all their organic functions are excited to healthful action, and the whole body is, consequently, more able to resist all those morbid impressions which have a direct tendency to derange the system at large, and to undermine the health.

During this period nervous diseases generally predominate, as melancholy, partial insanity, idiotcy, epilepsy, hysteria, chorea, &c., with the different fevers of the continued kind. About this age, also, what are commonly termed the manifestations of scrofula usually appear in swelling of the glands of the neck and other parts, followed often by marasmus, consumption, and water in the head: and inflammations are generally very violent, running their

course with great rapidity, and, if not checked in time, are very apt to end in incurable affections, as is often exemplified in attacks of inflammation of the lungs. Diseases of the heart are also very common in this period of life; perhaps they arise chiefly from the many sympathetic associations over which we have little control. The most generally fatal diseases of this age are consumption, continued fevers, inflammations of the chest and inflammations of the brain.

### *5th Period—Or Adult Age.*

In the table this period is divided into two epochs; 1st, Early Adult Age; and, 2d, Mature Age.

*Early Adult Age.*—The first epoch extends from twenty to thirty in the female, and from twenty-four to thirty-five in the male. During this period the whole frame continues to acquire strength, and although the body has ceased to grow in height it usually increases in bulk, and acquires greater breadth and firmness. The constitution is not so easily hurt at this period as during the stage of adolescence, all the parts having become more consolidated in consequence of both the mental and bodily powers having acquired a fixedness of operation. Besides possessing all the marks of complete growth, this epoch is characterized by certain appearances which stamp, as it were, the character and habits of the individual: the features have become partially moulded from the thoughts within: the whole body has acquired bulk, or conformation, according to the habits and temperament of the individual; and the mind has become resolved in its different pursuits, and, consequently, all its operations are carried on in a steady way. If the constitution has not been previously weakened by excesses or disease, this is an epoch the most exempt from all bodily ailments.

*Mature Age.*—It appears that, till about the age of forty, this epoch is upon the whole the most exempt from disease; but between forty and fifty, from the circulation becoming more languid, and consequently from the system

beginning to lose its resilient properties, the exciting causes of disease make more powerful impressions, and are, therefore, more serious in their effects. From this languid state of the circulation result the many congestive diseases almost peculiar to this age: hence the very frequent occurrence of obstructions and congestions in the bowels and other viscera. From congestion arise many derangements of the stomach, bowels, and liver, which give rise to gastric and bilious fevers, jaundice, &c. In time these congestions again give rise to affections of the heart, rheumatism, gout, hypochondriasis, inflammation of the kidneys, apoplexy, and paralysis.

So death seems to take place in this epoch chiefly from congestive diseases, brought on by the gradual changes which take place throughout the system with advancing years. And during this epoch of mature age the mortality is also very much increased from diseases of every kind generally proving more fatal than when occurring in the earlier periods of life.

During the above epochs, particular circumstances exert a mighty influence over the powers of the system; for it is a well-established fact, that a healthy locality, good sober living, and healthy employment, tend not a little to ward off the blighting advances of declining years.

### *6th Period—Declining and Old Age.*

In the table, this period is divided into four epochs; but as we cannot well treat of all the changes which the system undergoes through *declining age* by a general reference only, we will consider the four epochs individually. Before doing so, however, we will briefly consider the general changes which take place during the whole course of *declining age.*

Strictly speaking, age may be said to commence only when the bodily powers begin to diminish—a change the individual very soon finds out when he begins to estimate the strength of all his faculties compared to what they once

were. Even before a person finds out the diminution of his own bodily powers, certain external changes take place which too surely mark declining years.

The skin of the whole body becomes drier, and perhaps darker in the hue, which is best seen about the face and hands. The hair is getting more scanty on the forehead and crown, gradually assuming a dry appearance, with a progressive alteration of its colour to grey or white; the skin hangs loose over all the body in consequence of the shrinking of the soft solids beneath; and wrinkles appear about the face and neck, which, together with the grey and scanty hair, form the most decided symptoms of advancing years. The powers of exertion and walking also have begun to diminish, so the individual is no longer capable of undergoing his wonted bodily exercise: the whole system becomes soon tired from any exertion, and the step is shortened and embarrassed; hence the slow motion, and the unsteady gait, which always characterize the wanderings of the aged. Besides this defect in the walking, there is very generally a partial stooping and diminution of stature, which arise from the ossification of the *intervertebral* cartilages of the spine, and of the cartilages which connect the ribs with the breast-bone.

The vascular and nervous systems also undergo considerable changes. The arteries, the vessels which carry the *nutritient* blood to every part of the body, become gradually diminished in their calibre as age advances, whilst the veins, the vessels which carry back the blood to the heart, become much larger; hence the prominent appearance of the veins in old individuals. Such being the state of the vascular system in age, it is evident that, in proportion to the diminution of the arteries and the enlargement of the veins, there must be an equivalent of arterial and venous blood circulating in these vessels respectively: so, as the system declines into years, the *arterial* blood becomes less and less in quantity, whilst the *venous* is in an equal ratio increased. Such a change is a very

striking illustration of the gradual approach to death and decay which the system makes in declining age. The whole nervous system also changes in advanced life. In consequence of the diminished supply of arterial blood the brain becomes much drier in substance and smaller in bulk; the membranes which cover it become thicker and less translucid, being often quite opaque; the nerves also undergo a similar change, their vessels become more indistinct, and their soft part, the *medullary* substance, is very much diminished. Such changes taking place in the organs from which volition, sensation, and motion, take their origin, must affect very much all these respective attributes; hence the weak and wavering mind, hence the gradual oblivion of all the external senses; and hence the tottering step of age or second childhood. To these derangements of the nervous system succeed great alterations both in the external senses and in the different endowments of the mind. All the senses become very much blunted:—the eye has ceased to glisten with the vivacity of former years; it has become more sunk in its socket, and is more sluggish in all its motions: from this diminution and sinking its refractive power has become changed; and, owing to the altered state of the nerves, which supply the whole organs of sight, various changes in the humours and other parts may have taken place, from which result indistinct and distant vision, with many other different affections of the eyes and sight. The sense of hearing is also liable to many changes:—as age advances the hearing becomes less acute, which arises from the altered state of the auditory nerves; and the fluids or humours within the ear, like those in the eye, also undergo a change which renders them more or less insusceptible of the different impressions which give rise to the perception of distinct sounds. The sense of smell and taste also undergo changes from similar causes; and sensation generally, over the whole body, becomes more and more impaired with declining years.

To these changes in the external senses succeed great changes in the different mental endowments. All the perceptive faculties having been blunted, those of a reflective nature are consequently left almost in a dormant state: all the different mental impressions from external objects being neither duly perceived nor transmitted, soon lose their effect in stimulating the organ of mind, consequently its action becomes gradually impaired, and in very advanced age almost entirely ceases. Such is the dependence of mind on matter that the one declines with the other. But these outward changes in declining years are merely the apparent effects of the vital changes within. All the different organs for the preservation and nourishment of the system are completely changed in the performance of their functions. The processes of *digestion, assimilation, and sanguification*, are all imperfectly performed; from which, again, result morbid changes in all the different secretions. From the gradual influence of these changes in the system at large, the once athletic and vigorous individual has dwindled away to a mere form of what he was. The mind as well as the body is now incapable of acting in harmony with its wonted stimuli, and the mutual associations of both are all but gone; in short, mere life, or rather the germ of existence, is all that remains in token of its former attributes, being left almost insensible to every external impression, and, consequently, without the essential stimuli of vitality, for the want of which it decays and dies.

Having made these remarks on declining age generally, we will proceed to consider some of the changes as they take place in the different epochs.

1*st Epoch, or declining age*, is generally considered to extend from forty-two to fifty-two in the female, and from forty-eight to sixty in the male. Although the system at this epoch has begun to present many very evident marks of decay, it is a time when individuals are usually very healthy and active; indeed, it is often the best period

of life, for there is usually great keenness manifested in every undertaking in which the individual may be engaged. According to the mortality tables the proportional number of deaths is not much greater than in mature age. The probable, and real, vicissitudes in life tell very much upon the system during this period:—the mind is all anxiety about worldly concerns, and religious thoughts begin to press more heavily than in former years; for it would appear that as age advances graver thoughts take possession of the mind, and the individual is consequently racked betwixt the probabilities of his earthly and spiritual concerns. Such being the case, the body externally assumes a graver aspect:—the countenance is replete with mature expression, and altogether presents the well-marked signs of having been gradually wrought up by the influence of the various workings of the mind. Great changes also are taking place inwardly—the natural equilibrium of the circulation is gradually being destroyed; venous congestions, as we said before, take place in different parts, from which result numerous derangements of the different vital organs, such as obstructions of the bowels, engorgements of the heart, lungs, and liver, which affections are very often the forerunners of apoplexy and paralysis. So the diseases most fatal in this epoch are dropsies, asthma or bronchitis, obstructions in the bowels, kidneys, and liver, various affections of the heart, apoplexy, and paralysis. Gout and many other chronic diseases are often very prevalent also in this epoch of declining age.

2*d Epoch, or green old age,* may be said to extend to sixty-five in the female and to seventy in the male. In this epoch all the outward signs of decay are more marked, and the mind also suffers very much in all its associations, being generally very dubious and unfixed, though very tenacious of its long-cherished opinions. All the bodily powers begin to languish, which is soon followed by more or less relaxation of different parts. The teeth begin to drop out from the relaxed gums, in consequence of which the jaws are

more closely approximated; hence the projection of the chin, the falling in of the cheeks, and the universal alteration of the countenance, characteristic of this stage of life. Mastication being now imperfectly performed, the digestive organs suffer very much, and become less and less adequate for the performance of their functions.

This epoch is liable to all the diseases of the former one; but, of course, more so to rapid terminations, in consequence of the vital powers being more exhausted: seldom does the individual recover from any severe inflammatory complaint, there being a great proneness in this epoch to the supervention of fatal organic disease.

*3d Epoch, or ripe old age,* extends to about seventy-five in the female, and to about eighty in the male. During this epoch, all the manifestations of decay are more apparent. Besides those mentioned in the preceding, there are many other tokens of all but a complete breaking-up of the bodily powers: the most of the teeth have fallen out—the nose and chin are nearly approximated—the skin looks dark and withered—the secretion from the eyes is thick and altered, giving them a suffused appearance—the sight is very much bedimmed—the hearing is very hard—the senses of taste and smell are also much diminished—and the sensation generally is very obtuse: in short, there is every sign betokening a complete decay of all the bodily and mental powers. To these succeed the leanness of old age. This is accompanied with very marked diminution of all the remaining vital powers, and ushers in the last stage of life, or second childhood.

*4th Epoch, or that of decrepitude,* is the last epoch of life. It commences about seventy-five in the female, and about eighty in the male. Very few reach this extreme age, the utmost span of human existence. Decrepitude is characterized by very humbling appearances Behold the weak old man, half-bowed to the dust from which he sprung—his body emaciated—his muscles relaxed and wasted—the whole juices of his system

almost dried up—the skin is dry and wrinkled, and has lost its healthy hue—the knees are half-bent, and the thin legs totter at every step beneath the all-tottering body—the trunk is bent forward—the head hangs upon the breast—the features are shrunk and wan—and the eyes are bent on parent-earth. Such are the external appearances of worn-out mortality; and if we could as clearly see all the failings within, we would assuredly tremble at the prospect of decrepitude, and would consider death a happy consummation before the humiliating advances of extreme old age should be made upon us.

This epoch is liable to all the diseases of declining age, but, of course, with the balance to decrepitude in favour of their fatal effects. The whole apparatus of the body is worn down below working condition—her machinery is all irregular in its actions, for no organ performs its functions as formerly. The longer the vital spark continues to animate the frame, the more inharmonious are the workings within—congestions take place—rigidity and shrinking of the soft parts are the consequences, and partial obstruction of some important organ follows. The heart, having in a great measure lost its contractile power, is no longer fit to propel the vital current—the blood only laves in its cavities—it becomes almost stagnant in the lungs—the respiration falters—the heart ceases altogether to contract—the breathing is stopped, and life is extinct. Such is the termination of extreme old age.

It is a wise law of the Creator that when individuals have served their day, and are neither capable of enjoying the pleasures nor of performing the duties of life, they should be withdrawn from the busy action of the world. And instead of death being looked upon as a fearful visitation, and as a severe ordinance in the laws of nature, it ought to be considered one of the wisest institutions—one calculated upon the most divine principles—because

it removes us from a sphere which old age and disease renders us incapable of enjoying.

So, in taking a retrospective view of the physical condition of man, from the very first manifestation of his existence, and from his birth to his death, we must consider him in many different states of being. If we look upon him in the very first stage of embryo existence, he is found to be a mere *vesicle*, or drop of fluid. As gestation advances, that vesicle takes on a more definite form; and with each successive evolution of organization it approaches more and more to a perfect structure, and at birth is produced to the world a miniature specimen of the human race. The new-born infant is soft and succulent in all its parts; there is a preponderance of fluid throughout the whole system, which renders all its functional operations diffuse and free. It is like the off-shoot of a plant, green in its growth; but, like that also, it is susceptible in the highest degree of every impression injurious to its tender organization. But the infant "grows and is cherished"—it gradually becomes firmer in all its parts—more obdurate in many of its functional operations—and, consequently, becomes more obnoxious to those diseases which, when once excited in the system, are kept up as it were by the increasing resistance of all the tissues. In childhood the process of growth is still onward to closeness of structure, and, consequently, to diseases correspondingly tenable by the parts affected. In youth, along with the increasing density of the corporeal parts, there are also the conflicting currents of both the physical propensities, and the mental habits, to excite and to keep up all those diseases to which this period is more particularly liable. With mature life the density of the system has increased to a degree befitting its requisite compliances to the labours and duties of life; and as it continues for many years in a very similar state, it is consequently that stage, or rather state, of organization which may be justly considered most

durable, and which, as we have seen, is the period of life most exempt from disease and death. The termination of mature life is followed by the first advances of age, which is the commencement of those changes in the system that bring about the reversion of the solids over the fluids, and thus lead to all those diseases of old age which generally arise from rigidity of the system, in consequence of the vital juices being gradually dried up. Such are the progressive, the stationary, and the declining conditions of man—he rises step by step to maturity. In youth and manhood he blooms and flourishes for a little—the glory of his Creator, the wonder of himself, and the pride of others; but soon the withering blasts of time come athwart the height of his completion—he becomes a man past his best—old age steals on—he gradually merges into decrepitude—and finally he dies!

So the approach of man to death from infancy to extreme old age, when not prematurely beset by accidents or disease, is gradual and progressive. Condorcet, and others, have imagined that the organization of man is susceptible of being so changed or improved that his term of life may go on gradually increasing to an unlimited period; and, consequently, that the duration of life may yet become indefinite.* That the mean duration of man's life has been increased throughout different parts of the world, we have ample proof from statistics; but that the organization of man can be so improved or changed as to remove the final period of life to perhaps five or six hundred years, or to any very remote term ("greater *than an assignable quantity*"), is a mere supposition, founded upon no data which can be deduced from the laws of vitality. We observe that all the animated productions of the earth have a length of life corresponding to the rapidity of their growth to maturity. Some plants are of

* Esquisse d'un Tableau Historique des Pragrès de l'Esprit Humain.

an annual duration, their growth, perfection, and death being all completed in one season; others, as the oak, stand, it is said, for some hundreds of years; so it is with animals. Some animals live to a great age: the elephant and the eagle, it is thought, are both possessed of the chance of long life; but we see others, equally durable to appearance, as the horse and the dog, for example, whose natural duration of life, in the one case, does not generally go beyond thirty years, and in the other not much beyond twelve. The duration of life, then, is portioned out in different measures to all the different species of animated beings; and, as we said above, it seems to be regulated by the progress of their growth toward maturity. The *annual* rushes up, and is in perfection in the course of a month or two, and by that time again it decays and dies; but any other more durable vegetable production, as the oak, is long of coming to perfection, and it is also long before it decays. It is thought that some kinds of gnats enjoy only an *ephemeral* existence: they are called into being with the vapours of the morning, and, having arrived at maturity with the mid-day sun, perhaps, ere night has closed, their activity and fluttering have wrought such changes upon their tender organization as to have rendered it necessary to assume some new or different phases of life! The horse arrives at perfection or mature growth in about eight years, and man in about twenty-five, so four times the age of their maturity respectively marks about the extreme boundary which Nature has set to the continuance of their life. However sanguine we may be as to the probability of the aggregated duration of life being very much increased by all those means which are favourable to health and longevity, we are inclined to think that it must have its limits in those changes of the system which take place from the natural operations of the organic and animal functions themselves, as well as from all those influences which affect us as civilized and intellectual beings. To look for immortality is only a dream, or a

thought based upon such a fabric; for throughout the whole of Nature we have no evidence whatever of its possibility. We have already hinted in Chapter First, that every production in the universe is necessarily so acted upon by the natural laws, as also by those contingent influences under which circumstances may have placed it, that there is no avoiding those changes which ultimately lead to death and decay. Indeed, any other arrangement would be quite incompatible with the economy of Nature; for the processes of reproduction, of growth, and of decay, are all alike conducive to the continued and successive existence both of the mineral, vegetable, and animal kingdoms.

But it may be said, as we have many instances of individuals living to an age far beyond that of the average attained even by very aged individuals, and, as health and long life may be prolonged by a proper system of living, that there is a probability of life being gradually prolonged. Mr Augustus De Morgan says—"To suppose that the duration of human life is regulated by *no* laws, would be to make an assumption of a most monstrous character, *à priori*, and most evidently false. For it is a law, were it the only one, that no individual shall attain the age of 200 years." At the beginning of the chapter we have given some instances of a few individuals living to very advanced ages; but the Parrs and the Jenkins are only a bare exception to the general term or duration of individual life. The renowned Cornaro, although it is said he was of a delicate constitution, lived above a hundred years, which is attributed to his very abstemious mode of living. But long life, generally speaking, in any individual, may be compared to the capability of long continued action in any machine—the length of time, *ceteris paribus*, depending altogether upon its goodness or quality, and very much upon the kind and quantity of work which it has performed; so it is with man. From the many changes which are incessantly occurring in the organiza-

tion of the different individuals of the human race, under different circumstances, some are rendered less durable than others in constitution of body, and, consequently, break down sooner from tear and wear. Where is the machine that will work forever without decaying; and, alas! need we exclaim, where is the man whose body does not, sooner or later, manifest all the symptoms of decay also?

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## PART II.

General Remarks on Death; and on the Real Nature of Death.

*General Remarks on Death.*—As death is invariably the consequence either of irremediable organic derangement, or of decay, it ought to be looked upon as a most divine and benevolent institution, in removing us from a sphere of existence in which we could be no longer useful. Extensive organic disease of any of the vital organs always renders them unfit for the performance of their proper functions; so if, under such circumstances, an individual were to continue to live, it would only be to an imperfect state of existence, and, consequently, to a condition quite incapacitated for any useful purposes or enjoyment in life. But it is needless to dilate on what *would be* the effect of impaired organization continuing in action; for, being altogether inconsistent with the established laws of the Creator, and, moreover, being nonexistent, it does not merit any consideration at all, being merely a visionary reflection regarding the unknown.

In all ages death has been looked upon with a serious awe, and certainly no subject is more gravely calculated to awaken intense feeling and solemn reflection. Upon the thread of life hangs all that is interesting regarding all our worldly concerns, and with death the mortal remains

are called back to that primeval state of existence, which again identifies our corporeal elements with those from which they sprung.

> "Dust thou art and shalt to dust return."

So, when we die, all worldly and natural associations die with us, and it may be said that we depart this life in a state very similar to that in which we commenced it, namely, in utter unconsciousness. But this is only that state which immediately precedes dissolution; for, excepting in cases of delirium, we generally find individuals quite coherent and sensible on their approaching end—as sensible on the subject of death as ever they were on any subject through life, but chiefly thoughtful on the one theme only, being comparatively indifferent about all others.

It is a wise provision in Nature to let our worldly thoughts and affections become obliterated with our approaching end; for, under such circumstances, we slip as it were insensibly into eternity, and thus are spared the disquietude and pain which might otherwise be felt in the last agonies betwixt life and death.

The emotions and delirium of the dying are very frequently excited by the nature of the disease itself; for all mental impressions, whether real or imaginery, must operate most powerfully when the mind, through disease or protracted suffering, is rendered incapable of averting their influence. So death-bed manifestations cannot be always attributed to coherent mental excitement, they are more frequently just the delirium of the dying, from the excited state of the brain and nervous system. On this account deeds and confessions, in many cases, made immediately before death are not to be depended upon; for, even with apparent collectedness, there is generally too much at that time to distract the mind, and to pervert the judgment, to admit of calm and unbiased reflection. Un-

less there exist indubitate proof of *mental saneness*, the declarations of the dying ought in no case to be taken as sound positive averments respecting either themselves or others.

*Death and Change* are necessary consequences from the operations of the natural laws, because they result from those elementary actions which are the direct support of organization and vitality. The influence which one physical agent exercises upon another gives rise to certain reciprocal changes or effects, which may either prove conformable to their natural existence or not, just according to their harmony of action. We have seen that both the animate, and inanimate, creations are constantly undergoing revolutions and changes—in the one case the changes are either conducive to life or death—in the other they are conducive to all the natural and beneficial operations upon our earth; and in both they are conducive to each others support. Decay, disease, and death, are all the result of changes being excited, or taking place, in the molecular and integral structure of organized bodies. Death, as occurring from extreme old age, is the result of certain changes which are gradually brought about in the system in consequence of the long-continued action of all the vital parts. Death from actual disease arises from changes being first established in some of the constituent tissues of the body; the effects of which, being communicated more or less rapidly to other parts, ultimately give rise to that general derangement of the system which leads to the complete dissolution of all the vital endowments. Death, as occurring suddenly from the rapid accession of some fatal disease or from some violent injury, arises from the sudden extinction of organic power in some of the vital organs, whose uninterrupted operations were absolutely necessary for the continuance and support of life. In the vegetable kingdom decay and death occur in a similar way: the vegetable tissue, generally speaking, however, has greater powers of reparation than the animal;

but both are subject to similar organic changes as arising from injuries and disease. And when we go back to the inanimate structures of the globe, we also find that even they are not exempted from changes in their structural arrangements, which may be aptly compared to the decomposition of animal bodies, or those ultimate changes which resolve the corporeal remains of all animated beings into elementary atoms. So the whole universe of nature is constantly undergoing changes calculated for the continuance and support of the various natural productions. It may be said that the general result of all the operations of the natural laws is change; for, as we have seen, whether we direct our attention to the mineral, vegetable, or animal kingdoms, as associated with all the different natural agents and laws, we find that a regular series of organic and functional changes is constantly going on, all of which operate to one specific purpose—their own elementary preservation and endurance. Elementary changes, from the suspension of the *attraction of cohesion*, give rise to the development of particular elementary atoms, from former states of existence, into other states or conditions, arising from their relative associations in the reproductive operations of the chemical world. These elementary or chemical changes, again, give rise to different associations of integral masses or structures; which productions are the compound bodies of the universe, as governed and accompanied by their individual natural laws, and by all those specific effects and changes which their mutual operations upon each other produce, through the influence of those principles as embodied in elective affinity. Other mysterious changes being produced in these integral masses or structures, give rise to those manifestations of the Creator's inscrutable power, as exemplified in the production and growth of the vegetable and animal kingdoms. In every particular disease, and consequent aberration from general health, some of the products of the vital *organism* are depraved, or changed. In health we have

seen that the formation of blood, chyme, chyle, bile, gelatine, albumen, fibrine, mucus, serum, &c. &c. are all processes of reproduction for the nourishment and support of the system; but in disease all these processes are more or less changed, and their healthful influence is superseded by unnatural actions, which give rise to morbid products in their stead.

It would certainly be a very interesting and curious investigation to trace the various causes and phenomena of death in all the different grades of organization and vitality; but the present work does not admit of such extensive investigations. We will now consider briefly the remaining part of our subject, namely, the real nature of death, and the organic changes which it induces.

*On the Real Nature of Death.*—Death has been compared and treated of in connexion with *sleep, asphyxia, syncope or fainting, catalepsy or trance*, and some other affections; but it cannot be justly compared to any of these states, because they arise merely from a partial and temporary change in some of the functions of the nervous system, whereas death is a state quite distinct from vitality, and is, therefore, an absolute change altogether—the whole of the attributes of life being completely annihilated. We will shortly illustrate this position, by considering the real changes which take place in the above affections, or states of the system, compared with those from death.

Sound sleep is brought on by a temporary suspension of *animal sensibility*, accompanied with a partial modification of the other vital phenomena; and is induced by the peculiar state into which the nervous system is thrown by that languor which inclines to rest.

Asphyxia, or that state of the nervous system brought on by suspended respiration, consists in the partial suspension of *sensible organic contractility*, and of *animal sensibility*—first affecting the lungs, then the brain and heart, and from which the individual may recover or not, just according to the nature of the case.

*Syncope* or fainting is brought on by certain effects produced upon the nervous system. Like asphyxia, it is a partial suspension of *sensible organic contractility*, and of *animal sensibility ;* but the impression seems to be first on the nervous system generally, thus affecting the chief organic and animal functions almost simultaneously. The individual recovers as the effects of the impression wear off.

*Catalepsy* or trance is a very peculiar state of the nervous system, which sometimes supervenes in the course of other diseases. It consists in almost a complete suspension of *animal sensibility*, and of *animal contractility*, and must arise from some affection of those parts of the brain and nervous system which preside over these functions. The individual generally recovers in the course of a few hours; but in some cases the *trance* or fit continues for days. This affection cannot be mistaken for actual death by people of any observation at all.

Now all these different states may be compared to death in reference to the suspended consciousness or appreciable sensation of the individual; but in other respects they stand no comparison whatever. They arise merely from a partial suspension of certain nervous functions, which is generally of temporary duration only—going off within a given time, according to the nature of the case. So death cannot be compared to any of these states; for, as we said before, it consists in a complete cessation of one and all of the vital functions, and is, therefore, quite different from every state in the least connected with vitality.

Death may be considered under two divisions; first, the cessation of the vital functions; and, second, death or decomposition of the animal body.

*Death, First Stage of.*—Disease, accidents, and old age, we have seen, are the general physical causes of the first stage of death. After the *vital*, or, to speak more correctly, the *animating* functions, have ceased, there is a progressive subsidence of all those vital properties peculiar to animalization:—*nervous irritability*, and all the vital

operations which depend upon it, gradually become extinct.

But, that *nervous irritability* does not become quite extinct with the cessation of the animating functions, we have ample proof in the muscular motions which generally exist for some time in the bodies of slaughtered animals. These motions, it may be observed, continue long after every vital organ has been removed—when nothing has been left but the denuded carcase, most recklessly mangled, and most completely drained of blood. These motions, observed in the cutaneous muscles of slaughtered animals, arise from the nerves remaining for some time susceptible of stimuli; and are, consequently, excited by exposure to the air or any other stimulating body. After a bullock's head has been fractured—its brain having been beat in upon and torn, and after it has been skinned, and hashed off, and hung up on the slaughter house door-post, it still exhibits rapid muscular motions in different parts—motions which could not take place independent of *nervous irritability*. A similar phenomenon may be observed in the human subject, for a few seconds, in the slight twitches of the muscles of the face, after the respiration and action of the heart are completely suspended.

Such being the case, we are warranted in concluding that the annihilation of vitality is a gradual process.

Every one must have observed the trunks of trees budding and shooting forth small twigs, long after being felled to the ground, and denuded of all their branches and foliage: such is a process of growth continued from the existing vital powers within the trunk, long after being deprived of the benefit of its functional organs. Now, in the human body, after the *animating* functions have ceased, we have similar phenomena; some of the secreting functions continue, accompanied with their concomitant operations, such as the secretions and vermicular motions of the intestines: for some days after death, too, the animal heat often continues; and the nails and beard have been known

to grow. Such phenomena show that the *animating functions* are merely the stimuli of life, and that *vitality*, strictly speaking, is a property inseparably connected with organised bodies; for, with its extinction, all the attributes peculiar to vital organism become completely dissociated.

But the process of death is very much influenced by its cause. In protracted and severe disease, the vital energies become gradually exhausted with its continuance; so, when the *animating functions* cease, all the vital properties must become more rapidly extinct than in cases of sudden death—say from any violent injury. In the former case there is a gradual and progressive diminution of all the vital powers, the vital energies being exhausted and worn out before death has taken place; whereas in the latter all the vital powers may be quite vigorous, death being only produced by their accidental derangement and suspension. In the one case, therefore, the *nervous irritability* generally ceases much sooner than in the other.

We have seen that in some cases, as in drowning, the *animating* functions may be suspended and set agoing again to the restoration of life; but when these functions cease, either from severe disease or from irreparable injury, recovery is quite impossible.

*Death, Second Stage of.*—As the vital properties become extinct throughout the system, the second stage of death, or decomposition of the body, commences, which is the death of the animal molecules, or the breaking up of those tissues which form the animal machine. According to Nysten, *nervous irritability* continues longer in some parts of the system than in others; it first ceases to exist in the left *ventricle* of the heart, then in the stomach and bowels, then in the muscles of the trunk, and limbs, and, last of all, in the right auricle of the heart. But although Nysten has made these minute distinctions regarding the cessation of *nervous irritability* in different parts, we cannot in a work like the present follow out such an investigation in connexion with the changes we are about to

mention; so our remaining remarks will be very brief and general in reference to the complete decomposition of the body.

As the *nervous irritability* and heat of the body subside, rigidity and shrinking of the soft solids take place, and the skin assumes a dirty waxy appearance, clouded with bluish red patches, more or less diffused; these patches are most apparent upon the trunk, and seem to be owing to the inflltration of blood into the loose *cellular tissue:* however, the general appearances of the body after death depend very much on the nature of the disease. In cases of very malignant fever, and other diseases, the body is often bordering on decomposition ere death has taken place; but in general it is a good many hours, or even a few days, before it commences; and it is much longer in winter than in summer. The putrefactive process, as every one knows, is always accelerated by heat; indeed, intense cold, amounting to freezing, seems to prevent it altogether, as exemplified by the preserved state in which the bodies of animals have been found in icebergs.

The first signs of putrefaction in the human corpse, is a greenish hue of the *abdominal* integuments, with small abrasions of the skin, accompanied with the well known disagreeable fetor. When the decomposition becomes pretty general, the whole body becomes softer, more or less puffed up; and the breaking-up soft solids assume a dark sanious appearance. But as it would be no very agreeable task for the reader to follow us through all the stages of animal decomposition, we will cut short by a brief enumeration of the *ultimate* elementary changes which take place.

We mentioned before, that the animal fluids and solids are composed of the gases *azote, oxygen, hydrogen,* &c. &c., combined, in different proportions, with the solids *carbon, lime, soda, magnesia, sulphur, phosphorus,* and some others. Now, decomposition or putrefaction is the process which reduces the remains of our bodies into these

elementary substances again—to that state sustained by the laws of chemical affinity. Thus, the noxious exhalations which arise from putrifying animal matter consist chiefly of *volatile alkali*, and a gas called *carburreted hydrogen*. Now, putrid air is formed from the combination of *carburreted hydrogen* with *azote;* and the *volatile alkali*, again, is formed by the combination of *azote* with *hydrogen*. Nature, has, therefore, her laboratory both for reproduction and decay—all her productions undergoing the ordeal of its operations according to their place in her economy.

When we are under the preserving influence of vitality, we are, generally speaking, subject to those laws which act, for the most part, in harmony with it; but when the vital functions cease, our bodies are influenced by laws which operate for the general preservation of Nature: so, after death, our corporeal remains are reduced to an elementary state of existence—to a state qualified for taking on new actions, and of becoming associated again in the general operations of the universe. But here we are into the mysteries of the world of atoms; we are, so to speak, in the chaos of elements, amongst the inscrutable secrets of Nature. Here all our conceptions become vague—here all our powers of discovery and imagination fail—here all our thoughts merge into doubtful conjecture, and, consequently, all our perceptive faculties prove inadequate for any farther discovery as to the real nature of those wonderful changes which our corporeal particles undergo in their various states of existence. However, of the relative associations of matter in the different natural productions we know a great deal; and can thence deduce many important data respecting all their physical properties, both as affecting each other, and as they affect those inherent qualities, of animal organization, which give rise to all our faculties.

We have seen, in the first chapter, that we live under three great principles of preservation, namely, *attraction of*

*cohesion*, *elective affinity*, and *vitality*. Now, we also die in respect to three great principles too. Derangement of our bodily structure from disease, accident, or old age, brings about all those changes in our corporeal parts which lead to the annihilation of those vital functions whose operations give the stimuli or support of life; these, again, lead to the annihilation of all those organic actions which are the essential support and stimuli of animal organization: then we have the final separation of the simple atoms, whose various combinations give rise to the integral animal structure, and whose ultimate change is the death or decomposition of our corporeal remains. In these respective changes, then, we die in three distinct capacities:—

1*st*, As conscious living beings, endowed with all those vital attributes essential to animal and organic life.

2*d*, As an organized structure, endowed with those properties peculiar to animalization.

3*d*, As integral compounds, endowed with those properties common to inorganic bodies.

Throughout the various operations of Nature, then, there is nothing lost; for, whatever changes her productions may undergo, they are always brought back again to their primary state of existence—to that state which qualifies them for again taking on new actions, and of becoming in their turn the necessary source of other productions. These beneficial changes, though mysterious in their origin, are endless in their operation—certain in their effects—all conducive to one great end—their own continuance, from their destructive powers! So *change*, or *death*, is at once the destroying and preserving medium of all!

FINIS.

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